

Introduction

This document contains the results of Lolo National Forest Plan monitoring and evaluation that occurred in fiscal years 2000 and 2001. Normally, this information is reported annually but because of the extensive wildfire suppression efforts in 2000, no report was issued at that time. Monitoring and evaluation entail comparing the end results being achieved from land management activities to those projected in the Forest Plan.

Forest Land and Resource Management Plans (Forest Plans) are intended to provide long-range management direction for each National Forest. They provide guidance for balancing the physical, biological, and social components of forest management in the form of goals, objectives, standards, and guidelines. The Regional Forester approved the Lolo National Forest Plan in April 1986.

Monitoring and evaluation comprise the management control system for Lolo National Forest management and provide information on the progress and results of implementing the Forest Plan. The goals for monitoring and evaluating the Forest Plan are to determine:

- How well the Forest is meeting its planned goals and objectives
- If existing and emerging public issues and management concerns are being adequately addressed
- How closely the Forest Plan's management standards are being followed
- If outputs and services are being provided as projected
- If the effects of implementing the Forest Plan are occurring as predicted, including significant changes in the productivity of the land
- If the dollar and manpower costs of implementing the Forest Plan are as predicted.
- If implementing the Forest Plan is affecting the land, resources, and communities adjacent to or near the Forest
- If activities on nearby lands managed by private owners, other Federal or State Governmental agencies, or under the jurisdiction of local governments, are affecting management of the Forest
- If there is a need to amend or revise the Forest Plan

The Forest Plan monitoring and evaluation for the Lolo National Forest are described in Chapter V of the Lolo National Forest Plan.

Each year, the Forest Supervisor, District Rangers, and their staffs visit sample project sites. During these site visits, Forest Service personnel review and critique project implementation in terms of Forest Plan goals, standards, and specific monitoring items. This direct "management team" involvement develops a shared, forest-wide understanding of Forest Plan intent and effective ways to achieve that intent. Many corrective actions are developed during this process and implemented by the Districts in future project design.

The following pages contain individual reports for each monitoring item listed in the Lolo National Forest Plan (Chapter V, Table V.1, pages V-6 through V-13) and items added through Forest Plan amendment or policy changes.

The monitoring and evaluation information summarized in this document will be used during Forest Plan revision. The Lolo National Forest, working jointly with the Flathead and Bitterroot National Forests, is beginning the process of revising its Forest Plan. The Notice of Intent to revise the Lolo National Forest Plan was published in the Federal Register on May 10, 2002.

Summary

This summary provides a brief overview of Forest Plan Monitoring and Evaluation for the Lolo National Forest for fiscal years 2000 and 2001. The summary explains the Forest Plan, describes the monitoring methods and summarizes the results of the annual monitoring items. Chapter V of the 1986 Lolo National Forest Land and Resource Management Plan (Forest Plan) details the monitoring and evaluation process.

The Forest Plan is a set of decisions that guide the management of the Lolo National Forest. Generally, it contains three types of decisions:

- **Goals, Objectives and Desired Future Conditions** (pages II-1 through II-8 of the Forest Plan) provide general guidelines regarding future direction, as the Forest Plan is put into practice.
- **Standards** (pages II-8 through II-20, and Chapter III of the Forest Plan) direct how to put the Forest Plan into practice or provide conditions that must be met while the Forest Plan is being implemented.
- **Land Allocation** (the management areas or MAs described in Forest Plan Chapter III and displayed on the Forest Plan Map) divides the Lolo National Forest into areas that are suitable and available for different types of land management and resource production.

Table S-1 further summarizes the monitoring and evaluation results for fiscal years 2000 and 2001. For more detailed information, please refer to the Forest Plan Monitoring and Evaluation Report in its entirety.

Wildlife

Items 1-1 and 1-2: Effects of timber management on elk productivity are within acceptable limits on the four timber sales sold in 2000 and 2001. Monitoring over the years has shown that the objective of minimizing elk disturbance has been met and the current level of management activities has a minor impact on elk productivity.

Item 1-3: Stands meeting Region One old growth definitions were treated in 2000 and 2001. Vegetative treatments (including prescribed burning and timber harvest) were designed to enhance and/or maintain old growth characteristics. Approximately 1023 acres of old growth will be treated in timber sales sold in fiscal years 2000 and 2001.

Item 1-4: No snag monitoring was done according to the Northern Region Snag Management Protocol in fiscal years 2000 or 2001. However, 970 acres within the year 2000 wildfire perimeters were inventoried in 2001 to identify snag habitat important for nesting and foraging by woodpeckers. Results were used to ensure adequate snag retention in proposed fire-salvage operations.

Item 1-5: In fiscal years 2000 and 2001, spring grizzly bear habitat was improved as result of road decommissioning, vegetative treatments and protection of riparian habitat. Four new wolf packs were established on the Lolo National Forest during 2000 and 2001. Concerning bald eagles, an average of 1.3 fledglings per nest occurred in both 2000 and 2001. Lynx were listed as a threatened species in March 2000 and monitoring of this species occurred during 2000 and 2001. Peregrine falcons were removed from the

threatened and endangered species list in 1999 but surveys will be conducted for 5 years as part of the post-delisting program.

Item 1-6: Big game habitat improvement projects implemented during 2000 and 2001 included prescribed burning and aerial application of herbicides to enhance winter range forage. In 2000, 5045 acres (including 4609 acres of prescribed burning and 436 acres of aerial herbicide application) of big game winter range habitat improvement were accomplished and 955 acres of prescribed burning were accomplished in 2001.

Item 1-7: Several new occurrences of sensitive plants (including musk-root, sand spring beauty and clustered lady's slipper) were found in fiscal years 2000 and 2001, and several known locations were monitored. In order to understand how rare plants adapt to management activities and/or consequences of no management activity, Forest botanists have established monitoring plots for two sensitive species (clustered lady's slipper and hollyleaf clover). Monitoring plots have also been established to determine the short- and long-term effects of herbicide treatments on non-target forb species.

Aquatic Environment and Fisheries Habitat

Item 2-1: In 2000 and 2001, 33.5 and 43 miles, respectively, of fish habitat improvement were accomplished. Fish habitat improvement projects are typically accomplished at acceptable levels relative to Forest Plan projections. Overall the effectiveness of habitat improvement projects has been high.

Item 2-2: The 1996 assessment of unroaded and roaded watersheds and the 2000 Bull Trout Baseline Section 7 Watershed assessment indicate that fish habitat conditions and native fish populations across the Forest have not been maintained throughout the 15 years since the inception of the Forest Plan. However, many habitat responses have an associated lag time between the land management activity and the change in habitat associated with the activity, and it is therefore difficult to determine whether these reductions in habitat quality are a result of guidance in the existing Forest Plan or activities planned or implemented prior to the development of the Forest Plan.

Item 2-3: The Lolo National Forest, in partnership with Trout Unlimited, Montana Department of Fish, Wildlife and Parks, and the U.S. Fish and Wildlife Service, performed restoration work on Dunham Creek on the Seeley Lake Ranger District. The project was implemented in two phases. Phase one included the initial reconstruction, which occurred between July and September 2001. Phase two involved revegetation and transplanting, which occurred in the fall of 2001 and in the spring of 2002. Phase one restoration work included stabilizing streambanks, reconstructing meanders, riffles and pools, recontouring banks, shaping the channel, removing berms, and replacing large woody debris. The design sized the rehabilitated channel to convey water and sediments through the reach without impacting water surface elevations or stability relative to the upstream and downstream reaches. Monitoring over the next 3 to 5 years will determine the need for additional vegetation.

Timber

Item 3-1: The wildfires in 2000 were the primary natural forces at work on the Lolo National Forest during this reporting period. The ecosystems of the Northern Rockies and the natural resources they sustain, evolved with fire. Fire is essential to maintain the proper ecological functioning of these systems. However, uncharacteristically intense fire can significantly alter the short-term and, in some cases, the long-term productivity of soils, watersheds, and vegetation communities. At mid and upper elevations on the Lolo National Forest, the fires burned as would have been expected in pre-settlement times, creating conditions to which native plant and animal species were well adapted. At low elevations, fires burned more severely than would have been expected in pre-settlement. These burned areas will remain "outside the range of natural variability" for a long time. In

spite of the ecological benefits of the fires of 2000, the Lolo National Forest retains a significant deficit of acres that are “overdue” for fire. As a result, the Forest is less resilient to future disturbances.

Most burned areas will regenerate naturally. The Forest has made plans for reforestation some burned areas and is evaluating other treatments that are necessary to promote recovery within the burn.

Item 3-2: In both fiscal years 2000 and 2001, 4 miles of temporary road were reported as reclaimed. Past monitoring of this item has been limited to current temporary road closures and seeding. An assessment to view temporary road reclamation after a ten-year period has not been completed.

Item 3-3 to 3-6: Silvicultural prescriptions of four project areas were reviewed during fiscal years 2000 and 2001 and there were no departures from management direction. Silvicultural prescriptions met multiple use goals, considered residual trees and adjacent stands, and were practical. They have not been based primarily on maximizing dollar return or timber output, but have directly addressed the needs of ecosystem management and achieving Forest Plan objectives. During the 15-year reporting period, minor deviations have been observed. All of these deviations have resulted primarily from improper silvicultural prescription implementation relating to Forest Plan requirements for downed woody debris and snag retention.

Item 3-7: No even-aged harvest units exceeded 40 acres during fiscal years 2000 and 2001. During the 15-year reporting period (1987 through 2001), twenty even-aged harvest units have exceeded 40 acres. All of these units met management standards for exceeding 40 acres.

Item 3-8: This is a 5-year reporting item and was last summarized in the 1999 Forest Plan Monitoring Report. Plant and animal community diversity will be addressed during Forest Plan revision.

Item 3-9: During fiscal years 2000 and 2001, 151 acres were harvested on timber unsuitable lands for big game winter range improvement. Another 105 acres were harvested within campgrounds and other concentrated areas of public use to improve the recreational setting.

Item 3-10: Regulated timber volume sold in 2000 was 12 million board feet (MMBF), which is 11 percent of the 107 MMBF annual allowable sale quantity (ASQ) reported in the Forest Plan. Regulated timber volume sold in 2001 was 22 million board feet (MMBF), which is 21 percent of the 107 MMBF annual allowable sale quantity (ASQ) reported in the Forest Plan.

Item 3-11: Monitoring results indicate that 98 percent of the final harvest acres from 1976 through 1996 are adequately stocked. Currently, no acres are listed as regeneration failures for units harvested prior to 1996. For stands harvested from 1976 through 1999, the average time from planting, seeding or final harvest to satisfactory stocking is less than four years. A regeneration backlog is not developing.

Item 3-12: The total acres harvested by all silvicultural methods except commercial thinning to date are much less than projected in the Forest Plan.

Item 3-13: The silvicultural prescriptions monitored by the Forest silviculturist have been compatible with other resource values and objectives. Nearly all recent even-aged management proposed by ecosystem management assessments have been driven by a desire to replicate natural disturbance processes to maintain species diversity and

ecological sustainability. Compatibility with other resources is assessed during the interdisciplinary team interaction and Line Officer decisions.

Item 3-14: In fiscal years 2000 and 2001 there were no major departures from management direction, assuring harvest will not promote increases in disease and insects. In previous years, all departures from management direction, which would initiate further evaluation, were minor and related to residual tree treatment.

Item 3-16: A review of timber suitability is a function of Forest Plan revision. An interdisciplinary team does examine timber suitability during project level environmental assessments.

Item 3-EM: In general, projects that are currently being implemented have been identified as needs and/or opportunities during the NFMA analysis. In fiscal year 2000, the Burned Area Assessment displayed the analysis of watersheds burned during the wildfires of 2000 and formed the basis for initiating an environmental analysis for the burned areas. In fiscal year 2001, the Northside Timber Sale and the Canyon Face Timber Sale were reviewed during Forest monitoring trips. No departures from management direction were noted during the field review. Both of these projects fulfilled many of the opportunities identified during the NFMA analysis.

Water and Soil

Item 4-1: Based on over a decade of monitoring data, there is more than a 30 percent discrepancy between the baseline sediment and water yield values projected by the Forest Plan and actual measured data. There is a need to develop local coefficients for sediment and water yield for the Forest Plan revision. The Forest hydrologist believes that this monitoring item has served its purpose; further reporting was discontinued in 1998.

Item 4-2: The Lolo National Forest Plan, as amended by the Inland Native Fish Strategy, includes Riparian Management Objectives for stream temperature. Temperature measurements have been made as a regular part of the Lolo National Forest water monitoring program for the last 20 years. Twenty-seven sites located on tributaries of four major river basins within the Lolo National Forest were established for temperature recording in spring, summer and fall 2001. In almost all streams where historic data were available, summer stream temperatures exceeded the range reported as optimum for bull trout rearing. More information on stream temperature as related to local weather, and watershed characteristics is needed to determine if and where these objectives are achievable on the Lolo National Forest.

Post-fire temperature monitoring of streams within the area burned during the wildfires of 2000 indicated that burned watersheds might be more sensitive to changes in air temperature than unburned watersheds. The extent of this effect also depends on the amount of flow in a stream. According to the Montana Department of Environmental Quality, post-fire stream temperatures may be considered a new baseline from which to assess the impacts of any further management activities or future fires.

Water quality and soil productivity standards are maintained on the Lolo National Forest by applying Best Management Practices (BMPs). Beginning in 2000, hydrologists on the Lolo National Forest monitored specific sites where BMPs were implemented to determine BMP effectiveness. The results were published in The Best Management Practices Effectiveness Monitoring Report in March 2002.

Item 4-3: During 2000 and 2001, coarse woody debris retention was monitored on 13 active timber sales on the Lolo National Forest. All of the timber sale units assessed had sufficient amounts of coarse woody debris remaining on-site after timber harvest was complete.

Recreation

Item 5-1: Off-road vehicle (ORV) use is increasing on the Lolo National Forest, resulting in resource damage. Concentrated areas of ORV use are identified in the Forest Plan Monitoring Report. Recommendations are to continue to monitor ORV use across the Forest on an annual basis and document ORV-caused resource damage and user conflicts. Also, there is a need to identify critical issues that must be addressed prior to the next Forest Travel Plan update and Forest Plan revision.

Item 5-2: Although, visitor use was not monitored in fiscal year 2000 due to the extensive wildfires that year, it was substantially lower than previous years because of the extreme fire situation.

In fiscal year 2001, developed and dispersed use recreation was 497,000 and 888,000 recreation visitor days (RVDs), respectively, and was similar to Forest Plan projections. Wilderness use was 8413 RVDs, which is only about half of the Forest Plan projection. The Lolo National Forest currently manages 370,000 acres of wilderness-designated lands. No additional acreage was allocated to wilderness during this monitoring period. In 2001, 12 miles of trail were constructed and/or reconstructed on the Forest.

Item 5-3: This item is monitored on a 5-year basis. This item was last monitored in 1999 and no development has taken place in roadless areas on the Lolo National Forest since that time.

Range

Item 6-1: In fiscal years 2000 and 2001, a total of 2,251 and 2,544 Animal Unit Months (AUMs) of cattle grazing, respectively, occurred on the Forest. This is 16 and 18 percent, respectively, of the Forest Plan projection of 14,300 AUMs. This variation from Forest Plan projections triggers the need for further evaluation. Grazing is below Forest Plan projections due to several factors including vacant allotments, an overestimate of transitory range production and use, and an overestimate of grazing capability within Forest Plan standards. It is recommended that Forest Plan projections for forage should be updated to reflect forage capacity in areas of allotments, which are actually used by cattle.

Item 6-2: The Forest has been successful in the past in updating permits and several allotment plans for consistency with Forest Plan direction. In fiscal years 2000 and 2001, no analysis or allotment plans were completed due to limited resources as well as commitments to wildfire suppression efforts in 2000. However, annual field monitoring of active, stocked allotments with current analysis has shown grazing across the Forest complies with Forest Plan direction.

Item 6-3 and 6-4: In 1991, the Lolo National Forest completed the Noxious Weed Management Environmental Impact Statement (EIS) and Record of Decision for noxious weed management. This document became Amendment #11 to the Forest Plan. This amendment set levels for direct weed control and indirect weed control activities such as information and education, prevention, inventory, and biological management.

In fiscal year 2000, the Forest accomplished 99 percent of the biomanagement acre target, 5 percent of the mechanical treatment target, and 9 percent of the herbicide treatment target with 14 percent of the budget identified in the 1991 Noxious Weed Management EIS. In fiscal year 2001, the Forest accomplished 239 percent of the biomanagement acre target, 3 percent of the mechanical treatment target, and 64 percent of the herbicide treatment target with 35 percent of the budget identified in the 1991 Noxious Weed Management EIS.

Item 6-5: This item was not monitored in fiscal years 2000 and 2001. The Forest weed specialist recommends deleting or combining this item with Item 6-6.

Item 6-6: Sites on the Forest where herbicide treatments are applied show substantial reductions in weed density and spread. Monitoring emphasis is on biological release sites since there is wider variability in the site-specific effects of biological management agents. All nine weed species listed in the Forest Plan are spreading, but a slower rate than if there was not a Forest weed control program. Implementation of this program is preventing establishment of new invaders, slowing the spread of existing weeds and increasing public awareness.

Item 6-7: In fiscal years 2000 and 2001, 13 and 51 sites, respectively, were monitored across the Lolo National Forest. Monitoring at biological agent sites show varying results depending on weed species. Monitoring at herbicide treatment sites showed overall good control on weeds except Dalmatian toadflax. Three invader weed species have been discovered on the Lolo National Forest. Immediate control actions are being taken when new infestations are found.

Roads

Item 7-1: Open road density on two of the 16 herd units exceeds the Forest Plan standard of 1.1 miles/mile² on big game summer range. Although open road densities are below the 20 percent threshold that would require initiation of further evaluation, further opportunities to improve the open road density situations in these herd units will be investigated during landscape analysis processes.

Item 7-2: In fiscal year 2000, no roads were constructed; 50.1 miles of road were reconstructed; and 55.4 miles of road were decommissioned. In fiscal year 2001, 0.5 miles of road were constructed; 35.6 miles were reconstructed; and 39.4 miles were decommissioned. The miles of road construction and reconstruction are far below Forest Plan projections.

Item 7-3: No roads were designed beyond the limits of standards.

Item 7-4: One transportation plan was completed in 2000 and three were completed in 2001. The fiscal year 2001 results reflect the trend in the last decade to lower road densities.

Minerals

Item 8-1: In fiscal years 2000 and 2001, the Lolo National Forest administered 152 and 134 mineral cases, respectively. These outputs represent 92 percent and 80 percent of the Forest Plan projected annual average.

Item 8-2: No departures from approved operating plans, leases, or permits were documented in fiscal years 2000 or 2001.

Item 8-3: During fiscal years 2000 and 2001, mine reclamation planning continued for the Tarbox and Nancy Lee Mine sites on the Superior Ranger District. Reclamation and restoration activities at these mine sites will eliminate various physical hazards and releases of sediment and heavy metals that adversely affect human and environmental health. In fiscal year 2001, the Superior Ranger District also prepared a CERCLA Action Memorandum for the Flat Creek drainage as a result of a major forest fire and subsequent debris flow that moved through an abandoned mine tailings area adjacent to Flat Creek.

Economics

Item 9-1: Unit values used in FORPLAN have not changed significantly.

Visual Quality

Item 10-1: In fiscal year 2001, the Lolo National Forest monitored one timber sale, which is visible from Missoula, Montana, for visual quality. All of the timber sale units assessed met or exceeded the Visual Quality Objectives (VQOs) established for this project area by the Forest Plan.

The Forest landscape architect recommends that the economic feasibility of mitigation measures for project implementation be thoroughly assessed during the planning process.

Fire

Item 11-1: All prescribed burning projects had approved permits, and were within State guidelines for smoke management.

Item 11-2: In fiscal year 2000, 10,829 acres were treated using Forest Fire Projection funds and 1,658 acres were treated using Brush Disposal funds. In fiscal year 2001, 4,970 acres were treated using Forest Fire Projection funds, 1,145 acres were treated using Brush Disposal funds, and 5,882 acres were treated using National Fire Plan funds. During the 15-year reporting period, fuel treatments have averaged 188 percent of projection for Forest Fire Protection, but only 43 percent of projection for Brush Disposal. The low Brush Disposal accomplishment is due to timber harvest levels being lower than projected.

Item 11-3: Wildfire losses in calendar years 2000 and 2001 totaled 73,966 acres and 2,410 acres, respectively. For the 15-year reporting period, average annual wildfire acreage is over that projected in the Forest Plan because of the Canyon creek Fire in 1988 and the numerous large fires in 2000.

The Forest has averaged 68 percent of projection for acres of wildland fire use (prescribed natural fire). Projections of wildfire acres and wildland fire use acres will be reviewed during Forest Plan revision.

Adjacent Lands, Resources and Communities

Item 12-1: The change in area employment and area income is based on a historic timber harvest level in the Forest Plan of 92 million board feet and average permitted livestock level of 13,800 animal unit months. The change in area employment for the 15-year reporting period averaged negative 125 percent and the change in area income averaged negative 120 percent. However, actual changes in area employment and income are a result of total area economic activity, of which the Lolo National Forest is only a part.

Payments to counties used to be based on 25 percent gross receipts for timber sales, grazing permits, etc. The "Secure Rural Schools and Community Self-Determination Act of 2000" allowed counties to opt for a stable payment based on the average of the states' highest three payments between fiscal years 1986 and 1999. All counties with Lolo National Forest lands chose the level payment, which will remain in effect through 2006.

Item 12-2: Not reported in fiscal years 2000 and 2001.

Lands

Item 13-1: In fiscal year 2001, the Forest completed the Snowshoe Gulch land exchange that transferred 20 acres, located at the Double Arrow Lookout on the Seeley Lake District, into Federal ownership. This land exchange provided more land to develop a communication site at the Double Arrow Lookout.

Items 13-2 and 13-3: No utility or transmission corridors were designated through the Lolo National Forest last year. The final Yellowstone Pipeline Environmental Impact Statement was completed in November 2000 and the Record of Decision was issued in

May 2001. Yellowstone Pipeline has completed a majority of the reroute and abandonment of its petroleum pipeline that crosses National Forest System lands.

The Lolo National Forest issued authorizations or amendments to existing authorizations, several minor utilities rights-of-ways and one major utility right-of-way. These small right-of-way authorizations were for minor "spur" or "feeder" electric and telephone lines. In May 2001, the Lolo National Forest granted Touch America, a major communications company, an authorization to install a fiber optics line along Interstate 90, which is an established corridor.

Emerging Issues

Item 14-1: There were no new emerging issues in fiscal years 2000 and 2001.

Item 14-2: In 2001, Forest Plan Amendment #26 adjusted the Management Area designation on 407 acres on the Superior Ranger District. The result was a net increase of 345 acres in the timber suitable base.

Table S-1. Summary of the Lolo National Forest's Monitoring and Evaluation for Fiscal Years 2000 and 2001.

Item Number	Activity, Practice, or Effect	Comments
Wildlife		
1-1	Elk Productivity Timber Management Disturbance	Monitoring over the years has shown that the objective of minimizing elk disturbance has been met and the current level of management activities has a minor impact on elk productivity.
1-2	Elk Productivity Cover/Forage Ratio	When evaluated, cover/forage ratios for timber sales sold in 2000 and 2001 were adequate.
1-3	Timber Harvest in Old Growth (MA 21)	Stands meeting Region One old growth definitions were treated in 2000 and 2001 to enhance and/or maintain old growth characteristics.
1-4	Snag Retention	No snag monitoring was done according to the Northern Region Snag Management Protocol in fiscal years 2000 or 2001. However, 970 acres within the year 2000 wildfire perimeters were inventoried in 2001 to identify snag habitat important for nesting and foraging by woodpeckers.
1-5	Threatened & Endangered Habitat Improvement	In fiscal years 2000 and 2001, spring grizzly bear habitat was improved as result of road decommissioning, vegetative treatments and protection of riparian habitat.
1-6	Big Game Winter Range Improvement	In 2000, 5045 acres (including 4609 acres of prescribed burning and 436 acres of aerial herbicide application) of big game winter range habitat improvement were accomplished and 955 acres of prescribed burning were accomplished in 2001.
1-7	Threatened, Endangered, and Sensitive Plants and Plant Diversity	Several new occurrences of sensitive plants were found in fiscal years 2000 and 2001, and several known locations were monitored. Forest

Item Number	Activity, Practice, or Effect	Comments
		botanists have established monitoring plots for sensitive plant species to determine impacts from proposed activities. Monitoring plots have also been established to determine the short- and long-term effects of herbicide treatments on non-target forb species.
Aquatic and Fisheries Resources		
2-1	Fish Habitat Improvement	In fiscal years 2000 and 2001, 33.5 and 43 miles, respectively, of fish habitat improvement were accomplished.
2-2	Aquatic Habitat Quality and Fish Population Assumptions	The 1996 assessment of unroaded and roaded watersheds and the 2000 Bull Trout Baseline Section 7 Watershed assessment indicate that fish habitat conditions and native fish populations across the Forest have not been maintained throughout the 15 years since the inception of the Forest Plan. However, many habitat responses have an associated lag time between the land management activity and the change in habitat associated with the activity, and it is therefore difficult to determine whether these reductions in habitat quality are a result of guidance in the existing Forest Plan or activities planned or implemented prior to the development of the Forest Plan.
2-3	Riparian Activities and Effects	In 2001, the Lolo National Forest, in partnership with Trout Unlimited, Montana Department of Fish, Wildlife and Parks, and the U.S. Fish and Wildlife Service, performed restoration work on Dunham Creek on the Seeley Lake Ranger District. The design sized the rehabilitated channel to convey water and sediments through the reach without impacting water surface elevations or stability relative to the upstream and downstream reaches.
Timber		
3-1	Management Practices Minimize Hazards from Natural Physical Forces	<p>The wildfires in 2000 were the primary natural forces at work on the Lolo National Forest during this reporting period. At mid and upper elevations, the fires burned as would have been expected in pre-settlement times, creating conditions to which native plant and animal species were well adapted. At low elevations, fires burned more severely than would have been expected in pre-settlement. These burned areas will remain "outside the range of natural variability" for a long time. In spite of the ecological benefits of the fires of 2000, the Lolo National Forest retains a significant deficit of acres that are "overdue" for fire. As a result, the Forest is less resilient to future disturbances.</p> <p>Most burned areas will regenerate naturally. The Forest has made plans for reforesting some</p>

Item Number	Activity, Practice, or Effect	Comments
		burned areas and is evaluating other treatments that are necessary to promote recovery within the burn.
3-2	Temporary Roads are Revegetated within 10 Years	In both fiscal years 2000 and 2001, 4 miles of temporary road were reclaimed. A sampling of temporary roads constructed ten years previous has not been performed for this item.
3-3	Silvicultural Prescriptions Meet Multiple Use Goals	No departures from management direction
3-4	Silvicultural Prescriptions are not Based Primarily on Maximizing Dollar Return or Timber Output	No departures from management direction
3-5	Silvicultural Prescriptions Consider Residual Trees and Adjacent Stands	No departures from management direction
3-6	Silvicultural Prescriptions are Practical	No major departures from management direction
3-7	Silvicultural Prescriptions Meet Legal Size Limits	No even-aged harvest units exceeded 40 acres.
3-8	Selected Sale Alternative Provides for Plant/Animal Community Diversity	This is a 5-year reporting item and was last summarized in 1999.
3-9	Harvests on Unsuitable Lands Meet Other Resource Needs	No departures from management direction. During fiscal years 2000 and 2001, 151 acres were harvested on timber unsuitable lands for big game winter range improvement. Another 105 acres were harvested within campgrounds and other concentrated areas of public use to improve the recreational setting.
3-10	Timber Sold does not Exceed ASQ	Timber sold continues to fall well below the Allowable Sale Quantity.
3-11	Harvest Units are Restocked Within 5 Years	Monitoring results indicate a high success with reforestation, and a backlog is not developing.
3-12	Silvicultural Treatments Meet Projections	The total acres harvested by all silvicultural methods, except commercial thinning are below Forest Plan projections.
3-13	Even-aged Harvests are Compatible with Other Resource Values	No departures from management direction. Silvicultural prescriptions have been compatible with other resource values and objectives.
3-14	Harvests will not Promote Disease or Insect Increases	No major departures from management direction
3-16	Review Timber Suitability of Lands Classified as Unsuitable	Review of timber suitability will be conducted during Forest Plan revision.
3-EM	Ecosystem Management	No departures from management direction were noted during the fiscal year 2001 monitoring trips. The projects reviewed fulfilled many of the opportunities identified during the NFMA analysis.
Water and Soil		
4-1	Validate Sediment and Water Yield Assumptions	Need to develop local coefficient for sediment and water yield for Forest Plan revision.
4-2	Compliance with State and Federal Water Quality Statutes	During this reporting period, this monitoring item covered stream temperature findings and Best Management Practice (BMP) effectiveness.

Item Number	Activity, Practice, or Effect	Comments
		<p>In almost all monitored streams on the Lolo National Forest where historic temperature data were available, summer stream temperatures in 2001 exceeded the range reported as optimum for bull trout rearing, which does not meet the Inland Native Fish Strategy (INFISH) Riparian Management Objectives. More information on stream temperature, as related to local weather and watershed characteristics, is needed to determine if and where these objectives are achievable on the Lolo National Forest.</p> <p>The water temperature of streams within areas that burned during the 2000 wildfires was monitored in 2001. Initial data indicate that the burned watersheds may be more sensitive to changes in air temperature than unburned watershed. The extent of this effect depends on the amount of flow in a stream. According to the Montana Department of Environmental Quality, post-fire stream temperatures may be considered a new baseline from which to assess the impacts of any further management activities.</p> <p>The Best Management Practices Effectiveness Monitoring Report, published in March 2002, is the concluding report of an effectiveness monitoring program started on the Lolo National Forest in June 2000.</p>
4-3	Soil Productivity	During 2000 and 2001, coarse woody debris retention was monitored on 13 active timber sales on the Lolo National Forest. All of the timber sale units assessed had sufficient amounts of coarse woody debris remaining on-site after timber harvest was complete.
Recreation		
5-1	Limit Off-Road Vehicle Damage	Off-road vehicle (ORV) use is increasing on the Lolo National Forest, resulting in resource damage.
5-2	Provide Projected Spectrum of Recreation Opportunities	In fiscal year 2000, visitor use was not monitored due to the extensive wildfires that year. In fiscal year 2001, developed and dispersed recreation use was similar to what was projected in the Forest Plan. Wilderness use was about half of what was projected. Miles of trail construction and/or reconstruction were about 70 percent of what was projected in the Forest Plan.
5-3	Changes in Roadless Lands Match Projections	This item is monitored on a 5-year basis. This item was last monitored in 1999 and no development has taken place in roadless areas on the Lolo National Forest since that time.
Range		
6-1	Livestock Forage Meets Projections	In fiscal years 2000 and 2001, Animal Unit

Item Number	Activity, Practice, or Effect	Comments
		Months (AUMs) of cattle grazing on the Forest were 16 (2,251 AUMs) and 18 (2,423 AUMs) percent, respectively, of the Forest Plan projection of 14,300 AUMs. It is recommended that Forest Plan projections for forage should be updated to reflect forage capacity in areas of allotments, which are actually used by cattle.
6-2	Range Allotment Management Plans Meet Forest Plan Direction	Annual field monitoring of active, stocked allotments with current analysis has shown grazing across the Forest is in compliance with Forest Plan direction.
6-3	Indirect Noxious Weed Control	The Forest is focusing on information and education programs for weed awareness. In fiscal years 2000 and 2001, although the Lolo National Forest received 14 and 34 percent of the budget necessary to implement the direction stated in the 1991 Noxious Weed Management EIS, a greater percentage of the actual budget received was spent on Indirect Weed Control than the proportion identified in the 1991 Noxious Weed Management EIS.
6-4	Noxious Weed Control Treatment Projections	In fiscal years 2000 and 2001, Forest personnel treated a total of 24 percent (832 acres) and 92 percent (3,184 acres), respectively, of the 3,440 acres annual projection in the 1991 Noxious Weed Management EIS.
6-5	Noxious Weed Acres and Spread Assumptions	This item was not monitored in fiscal years 2000 and 2001. The recommendation is to combine this monitoring item with Item 6-6 because both items focus on weed spread and the effectiveness of control efforts.
6-6	Noxious Weed Control Objectives	Herbicide treatments have provided effective weed control. There is a wider variability in the site-specific effects of biological management agents. The Forest weed control program is preventing new weed invaders from establishing, slowing the spread of existing weeds and increasing public awareness.
6-7	Noxious Weed Control Implementation and Effectiveness	In fiscal years 2000 and 2001, 13 and 51 weed treatment sites, respectively, were monitored across the Lolo National Forest. Sites with direct controls applied showed significant reductions in weed density. Prevention of the establishment of new weeds on the Forest and control of weeds on certain high value resource sites has been successful.
Roads		
7-1	Open-Road Densities Meet Plan Direction	Open road densities of two herd units exceed the Forest Plan standard in big game summer range.
7-2	Road Construction Review	In fiscal year 2000, no roads were constructed; 50.1 miles of road were reconstructed; and 55.4 miles of road were decommissioned. In fiscal

Item Number	Activity, Practice, or Effect	Comments
		year 2001, 0.5 miles of road were constructed; 35.6 miles were reconstructed; and 39.4 miles were decommissioned. The miles of road construction and reconstruction are far below Forest Plan projections.
7-3	Road Design and Construction Standards Review	No roads were designed beyond the limits of standards.
7-4	Road Densities Match Forest Plan Projections	The fiscal year 2001 results reflect the trend in the last decade to lower road densities.
Minerals		
8-1	Forest Service Project Effects on Minerals Activities	In fiscal years 2000 and 2001, the Lolo National Forest administered 152 and 134 mineral cases, respectively. These outputs represent 92 percent and 80 percent, respectively, of the Forest Plan projected annual average.
8-2	Minerals Activities and Effects on other Forest Resources	No departures from approved operating plans, leases, or permits were documented in fiscal years 2000 or 2001.
8-3	Mineral Activities with Positive Effects on other Resources	During fiscal years 2000 and 2001, mine reclamation planning continued for the Tarbox and Nancy Lee Mine sites on the Superior Ranger District. In fiscal year 2001, the Superior Ranger District also prepared a CERCLA Action Memorandum for the Flat Creek drainage as a result of a major forest fire and subsequent debris flow that moved through an abandoned mine tailings area adjacent to Flat Creek.
Economics		
9-1	Verify FORPLAN Unit Costs	Unit values used in FORPLAN have not changed significantly.
Visual Quality		
10-1	Project Compliance with Visual Quality Objectives	All timber sale units monitored in fiscal year 2001, met or exceeded Visual Quality Objectives.
Fire		
11-1	Prescribed Fire Meets Air Quality Standards	All burning was accomplished under permit and within State guidelines.
11-2	Fuel Treatments Meet 75% of Forest Plan Projections	In fiscal years 2000 and 2001, burning accomplishments fell short of targets. During the 15-year period under the Forest Plan, fuel treatments have averaged 188 percent of projection for Forest Fire Protection funded activities, but only 43 percent of projection for treatments funded by Brush Disposal deposits.
11-3	Wildfire Losses do not Exceed 100% of 10-Year Plan Projections	Wildfire losses in calendar year 2000 and 2001 totaled 73966 acres and 2410 acres, respectively, on Forest Service ownership. The annual Forest Plan projection is 2907 acres.
Adjacent Lands, Resources and Communities		
12-1	Forest Management Effects on Local Economy, Recreation Opportunities, Downstream Water Uses, Visual Quality, and Local Air Quality	Total area income and employment are substantially less than Forest Plan projections. However, actual changes in area employment and income are a result of total area economic

Item Number	Activity, Practice, or Effect	Comments
		activity, of which the Lolo National Forest is only a part.
12-2	Impact of Adjacent Activities on Forest Goals and Objectives	Not reported in fiscal years 2000 or 2001.
Lands		
13-1	Land Adjustment Program	In fiscal year 2001, The Forest completed the Snowshoe Gulch land exchange which transferred 20 acres, located at the Double Arrow Lake on the Seeley Lake District into Federal ownership. In exchange, 20 acres on the Superior District were transferred into private ownership.
13-2	Major Utility and Transportation Systems are Developed within Identified Corridors	The Yellowstone Pipeline EIS was completed in November 2000 and the Record of Decision was issued in May 2001. Yellowstone Pipeline has completed a majority of the reroute and abandonment of its petroleum pipeline that crosses National Forest System lands.
13-3	Right-of-way Grants are in Identified Corridors	The Lolo National Forest issued authorizations or amendments to existing authorizations, for several minor utilities rights-of-way and one major utility right-of-way. These small right-of-way authorizations were for minor "spur" or "feeder" electric and telephone lines. May 2001, the Lolo National Forest granted Touch America, a major communication company, authorization to install a fiber optics line along Interstate 90.
Process		
14-1	Emerging Issues and Changing Social Values	There were no new emerging issues in fiscal years 2000 and 2001.
14-2	Correct Land Allocation Errors	In 2001, Forest Plan Amendment #26 adjusted the Management Area designation on 407 acres on the Superior Ranger District. The result was a net increase of 345 acres in the timber suitable base.

Monitoring Item 1-1: Elk Disturbance

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Elk Productivity - total time of human disturbance created by management activities
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Timber management disturbance occurring more than 4 out of 10 years

Introduction: Disturbances like timber sales result in elk leaving the affected drainage. Frequent disturbance may adversely affect elk productivity. The Lolo National Forest Plan assumes that an area used by a particular elk herd ("herd unit") will be re-entered no more than every 17 years. This monitoring item displays (1) the interval between activities and (2) the amount of time since the last entry when disturbance occurred in the herd unit.

Methods: The "**activity coefficient**" = **duration/interval**. The **interval** since the last sale equals the difference between the year beginning the last sale's activity and the current year. The **duration** is the number of years in which major activities occurred during the interval. Major activities include road building, timber felling, and skidding; but omit minor actions like planting and burning.

Results: Table 1-1A shows pertinent disturbance information for timber sales with volumes over 2 million board feet (MMBF) sold in fiscal years 2000 and 2001.

Table 1-1A. Past Disturbance in Elk Herd Units for Timber Sales Sold in 2000 and 2001.

Sale Name	First Year of Last Major Entry	Duration of Last Entry	Interval	Activity Coefficient
Mosquito Helio	1987	4	14	0.29
Clearwater Stewardship	1989	4	12	0.33
Key Pole Salvage	1983	3	18	0.17
Petty Rock Helio	1988	3	14	0.21

Evaluation: This monitoring item was developed to avoid disturbing elk in summer range when harvest levels were much higher and regeneration harvest was the norm. Monitoring over the years has shown that the objective of minimizing disturbance has been met and the current level of management activities has a minor impact on elk productivity. In most current Forest timber sales, avoiding disturbance to elk is not an issue. Providing larger security areas (see item 1-2) was included in these sale analyses.

Mosquito Helio was preceded by Prospect Blowdown (1987-1991) and Denver Nine (1979-1991). Timber was harvested intermittently in the Denver Nine sale area during this long time period. Helicopter sales are less disturbing to wildlife because of reduced road construction.

Clearwater Stewardship was preceded by East Loop (1989-1992)

Key Pole Salvage was analyzed in the Mill-Key-Wey Environmental Impact Statement, which proposed salvage of dead and dying lodgepole pine stands. The analysis included multiple entries to salvage lodgepole pine. Pardee Flat (1983-1985) preceded this salvage sale.

Monitoring Item 1-2: Elk Cover/Forage Ratio

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Elk Productivity –cover/forage ratios

REPORTING PERIOD:

5 years

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

Any cover/forage ratio below 40/60 in a minimum
analysis area of 4,000 acres

Introduction: Elk need hiding cover for security to raise calves and to avoid hunters in the fall. They also need thermal cover for warmth and snow interception in winter. The cover/forage ratio compares the area of forested land to the area in openings. Maintaining a cover/forage ratio 40/60 ensures that at least 40 percent of an area provides cover.

In the late 1980s, researchers showed that bull elk move into larger patches of cover away from roads during the hunting season. A second measure of cover, called "elk security," was developed which includes only patches of cover over 250 acres that are ½ mile to 1 mile from a road open during hunting season (the distance depends on terrain). The desired level of hunting season "security areas" is 30 to 35 percent of the analysis area.

Methods: Biologists assessed the cover/forage ration and elk security for all timber sales over 2 MMBF sold in 2000 and 2001.

Results: Refer to Table 1-2A.

Table 1-2A. Cover/forage Ratio and Elk Hunting Season Security in Sales Sold in fiscal years 2000 and 2001.

Sale Name	C/F Ratio	Was hunting season security assessed?
Mosquito Helio	See evaluation	The project obliterated or abandoned 2.9 miles of existing roads, increasing the security cover by 3 percent to total 42 percent.
Clearwater Stewardship	Not calculated*	12.8 miles of system roads and 38 miles of non-system roads are being obliterated. One mile of road was closed by a gate.

Sale Name	C/F Ratio	Was hunting season security assessed?
Key Pole Salvage	Not calculated*	This sale is in an area where the cover/forage ratio is much greater than 40/60. Open road density decreased to 1.5 miles/mile ² so security cover increased by one percent to a total of 22 percent.
Petty Rock Helio	No increase	Open Roads were reduced from 1.3 to 1.2 mile/mile ² , increasing security cover to 17.2 percent.

*Cover/forage was not calculated for several reasons: 1) The percent cover is unnaturally high across the Forest due to fire suppression and changes in harvest techniques. 2) Treatments were improvement cuts designed to retain cover at the stand level. 3) Security needs were evaluated and improved by these actions.

Mosquito Helio Sale: The existing cover/forage ratio prior to the project was 73/27. In winter range it was 59/41. Prescribed treatments would not come close to exceeding the 40/60 cover/forage limit.

Approximately 1709 acres of winter range were underburned in the Key Pole Salvage sale area to improve forage conditions for big game.

Monitoring Item 1-3: Old Growth Harvest

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor effectiveness of old-growth habitat areas (Management Area (MA)) 21 that are harvested
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	20 percent degradation in short run and 10 percent in the long run.

Introduction: The Lolo National Forest Plan allows treatments like burning and logging in old growth forests. In this monitoring item, Forest biologists assess treatments for any detrimental effects on old growth quality. In some forest types, removal of understory and underburning are beneficial to old growth quality and may occur in stands to reduce competition and the threat of stand-replacing fires.

Methods: For each timber sale, biologists described and assessed the quantity of old growth treated and the effects on old growth. The results are displayed for (1) all acres that are designated old growth in the Lolo National Forest Plan (MA 21) and (2) other acres that meet the Region 1 definition of old growth for the specific forest type.

Results: Stands meeting regional old growth definitions were treated. Vegetative treatments were designed to enhance and/or maintain old growth characteristics.

Table 1-3A. Old Growth Treated in Sales Sold in fiscal years 2000 and 2001.

Sale Name	Treatment in Old Growth?	In MA 21?	Describe Old Growth treatment and if beneficial
Mosquito Helio	77 acres	No	Although 77 acres were treated to enhance

Sale Name	Treatment in Old Growth?	In MA 21?	Describe Old Growth treatment and if beneficial
			old growth characteristics.
Boyer Salvage	No	No	
Arch Inez	Yes	No	Two harvested stands meeting old growth definition kept the large old trees and reduced the understory.
Clearwater Stewardship	No	No	
Key Pole Salvage	531 acres	No	531 acres of 3442 acres (15%) were treated to enhance old growth characteristics.
Shapes and Feathers	63 acres	No	43 acres of irregular shelterwood cutting designed to retain old growth characteristics and 20 acres of small patch seed tree cuts out of 1600 acres of suitable old growth were treated.
Petty Rock Helio	352 acres	No	352 acres of old growth selection cutting to enhance old growth characteristics.

Key Pole Salvage was in the Superior North NFMA analysis where old growth was designated to equal 8 percent of the total for three Ecosystem Management Areas (EMAs). Treatments in existing old growth included 136 acres of burning, 334 acres of improvement cuts, and 61 acres of individual tree selection. The objective of these treatments was to restore and develop late-seral forest conditions similar to the historic disturbance regime by leaving the large old trees and treating the understory vegetation.

In Petty Rock Helio, a selective harvest of smaller merchantable understory was prescribed to increase growth of the remaining stand and reduce ladder fuels that place the old growth at risk.

Monitoring Item 1-4: Snag Retention

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Post-sale snag densities

REPORTING PERIOD:

5 years

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

30 percent or more of transects fail to meet Forest snag prescriptions

Introduction: The Northern Region Snag Management Protocol (January 2000) replaced the previous snag guidelines used on the Forest. Snag retention recommendations, snag management recommendations, snag recruitment, implementation, monitoring and inventory are addressed in the Protocol. Due to the natural variability of snags across the landscape, recommended prescriptions for snag retention are based on Vegetative

Response Units (VRU; a combination of potential habitat type, fire group and slope class; Table 1-4A). The methodology for monitoring snags in the 2000 Protocol is the same methodology used by the Lolo National Forest since 1996.

Table 1-4A. Current snag retention recommendations.

VRU Cluster	VRU Description	Snags/acre
1	Warm, dry ponderosa pine, Douglas-fir	1-2 greater than 20" diameter at breast height (dbh)
2	Cool Douglas-fir, warm grand fir on gentle slopes	4 greater than 20" dbh
3	Cool Douglas-fir, warm grand fir on steep slopes	6-12 total, with 2-4 greater than 20" dbh
4	Cool, wet, and dry spruce, grand fir, hemlock and subalpine fir	6-12 total with 2 greater than 20"
5	Low elevation cedar, hemlock	12 total with 4 greater than 20" dbh
6	High elevation spruce/fir/lodgepole pine	5-10 greater than 10" dbh
7	Whitebark pine/limber pine	All available

Methods: Ten percent of pre-harvest units are sampled (one 1/5 acre plot for every 2 acres; plots established at 132 foot intervals on a pre-established grid). One hundred percent of post-harvest units are sampled (i.e. every snag is visited).

Results: No snag monitoring was done according to the Northern Region Snag Management Protocol in 2000 or 2001 due to extensive fire activity on the Lolo National Forest in 2000. However, 970 acres within the Ninemile, Flat Creek, Landowner and Alpine Fires of 2000 were inventoried during the summer of 2001 to identify snag habitat important for nesting and foraging by woodpeckers (2001 Post-Burn Woodpecker Study). Results were used to ensure adequate snag retention in proposed salvage operations.

Monitoring Item 1-5: Threatened and Endangered Species Habitat Improvement

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Acres of threatened and endangered species habitat improvement
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Forest must accomplish 75 percent of habitat improvement program for a 5-year period with at least 50 percent accomplished every year.

Introduction: Threatened and endangered (T&E) species on the Lolo National Forest include the grizzly bear (threatened), bald eagle (threatened), gray wolf (endangered) and

lynx (threatened). During the past 11 years, grizzly bears have received the greatest benefit from T&E habitat improvement projects on the Forest. The primary methods of habitat improvement for the grizzly bear has been through road closures and road obliteration projects.

Methods: Acres of T&E habitat improvement are documented in the Wildlife, Fish and Rare Plants (WFRP) report for 2000 and 2001. The acres of habitat improvement in the WFRP report generally exceed the number of acres of habitat improvement included in the Management Attainment Report (MAR). The WFRP report includes all T&E habitat improvement acres whereas the acres reported in the MAR are limited to projects covered by specific funding sources.

Results:

Fiscal year 2000: Spring grizzly bear habitat was improved as a result of road restoration and obliteration projects in the Monture Subunit of the Northern Continental Divide Ecosystem (Monture Road Restoration Project – 1,000 acres) and the Mount Headley Bear Management Unit of the Cabinet-Yaak Ecosystem (Tepee Road Obliteration Project – 1,035 acres).

Fiscal year 2001: Grizzly bear habitat was improved as a result of vegetative treatments in the Swan Subunit (Clearwater Stewardship Project – 410 acres) and protection of riparian habitat (2-miles of fence along Two Creeks – 100 acres).

5-year average: The 5-year actual average of Threatened and Endangered species habitat improvement for 1997 through 2001 was 1,483 acres, which is 1,854 percent of the Forest Plan projected annual average.

Partnership Funds: The Two Creeks project was accomplished primarily through funds contributed by the Montana Department of Fish, Wildlife and Parks and the Blackfoot Challenge.

Evaluation:

Grizzly Bear

Northern Continental Divide Ecosystem (NCDE): Seven subunits within the NCDE occur on the Lolo National Forest: Rattlesnake, Mission, Swan, Morrell-Dunham, Monture, South Scapegoat and North Scapegoat. The current guidelines call for less than 19 percent of each subunit to have a specific open road density over one mile/mile²; less than 19 percent of each subunit to have a specific total road density over two miles/mile²; and 68 percent or more of the subunit to be over 0.3 miles from a road (core area). Four of the seven subunits (Rattlesnake, Monture, South Scapegoat and North Scapegoat) meet the current Interagency Grizzly Bear Committee (IGBC) road density guidelines for the amount of open and total roads and for the percent of core area.

The Mission, Swan and Morrell-Dunham subunits do not meet some of the current IGBC guidelines. The Mission subunit exceeds the total road density guideline; however, because more than 25 percent of the subunit is private industrial land, the guideline for Forest Service land is "no net loss" (i.e. activities on National Forest System Lands cannot increase the existing total motorized road densities).

The Swan subunit continues to exceed current guidelines for open and total road density. The Morrell-Dunham subunit is within a few percentage points of the open and total road density targets, but is lacking core in spring range. Implementation of several projects, scheduled to be completed by the end of 2003, are being designed to reduce open and total road densities and move the Forest towards the IGBC road density standards in the

Swan and Morrell-Dunham subunits: 1) Dunham Road Closures; 2) Clearwater Stewardship Project and 3) Clearwater Roads Project.

Cabinet-Yaak Ecosystem: The Cabinet-Yaak Ecosystem has only one Bear Management Unit (Mount Headley or BMU #22) within the boundaries of the Lolo National Forest. Early in 2001, the Lolo, Kootenai and Idaho Panhandle National Forests began an environmental analysis to design access management guidelines for the Selkirk and Cabinet-Yaak grizzly bear recovery zones. BMU #22 is included in this analysis. At the time the analysis began, open road densities greater than 1 mile/mile² existed on 37 percent of the BMU, total road density greater than 2 miles/mile² existed on 41 percent of the unit, and 47 percent of the unit was core bear habitat.

Monitoring Item 1-5A: Threatened and Endangered Species Monitoring

Methods and Results:

Grizzly Bear

As part of a cooperative monitoring project with the Flathead National Forest and the Northern Continental Divide Ecosystem (NCDE), three hair-snaring sites were located on the Seeley Lake Ranger District in 2001. DNA samples from these sites resulted in confirmation of one female and one male grizzly bear.

Gray Wolf

The U.S. Fish & Wildlife Service continued to monitor wolf packs in Montana during 2000 and 2001. Four new packs were established on the Lolo National Forest during the two-year period including the Fish Creek, Lupine, Little Thompson and Clearwater packs. The Ninemile and Fishtrap packs, established in previous years, continued to be productive. Members of the Kelly Creek and Bighole packs (established in Idaho) and the Danahar pack (established on the Flathead National Forest in Montana) were occasionally located on the Lolo National Forest. One permittee on the Lolo National Forest (within the area used by the Bighole pack) took the 'non-use' option on his livestock grazing permit in 2000 and 2001.

Bald Eagles

A total of twelve nests (Ninemile District, 3; Plains/Thompson Falls District, 5; Seeley Lake District, 3; Missoula District, 1) are currently located on or adjacent to the Forest. Ten of the nests were monitored in 2000 and all twelve were monitored in 2001. The average number of fledglings/nest was 1.3 in 2000 and 2001. Nest-by-nest results are on file with the Montana Department of Fish, Wildlife and Parks, threatened and endangered species division, Bozeman, Montana.

Lynx

Lynx were listed in the contiguous United States as a threatened species in March 2000. Twenty-four hair pad transects were established during 2000 within the boundaries of the Seeley Lake Ranger District as a part of the Lynx National Survey Grid. In 2000 and 2001, seventeen transects located on Plum Creek Timber Company lands and seven transects located on National Forest System lands were monitored by the Lolo National Forest. Hair on several of the hair pads was identified as lynx hair though DNA analysis. Data continues to be collected as part of this survey.

The Rocky Mountain Research Station initiated a research study on lynx during the winter 1997-1998. The study area includes a portion of the Seeley Lake Ranger District. A number of lynx have been trapped and radio-collared and data continues to be collected for this study.

The Clearwater Ecosystem Management and Timber Sale project, implemented beginning in 2001, will be beneficial to lynx. Foraging habitat is currently adequate, but there is little recruitment forage (stands of 0-15 years old) on the landscape. Approximately 150 acres of openings were created to mimic wildfires. Large amounts of coarse woody debris were retained to further mimic post-burn stand structures.

Peregrine Falcons

Peregrine falcons were removed from the list of threatened and endangered species on August 25, 1999. Peregrine falcon surveys will be conducted for 5 years as part of a post-delisting monitoring program mandated by the Endangered Species Act.

- Fiscal year 2000: Several historic eyries were monitored – 4 fledglings were documented at the Ninemile eyrie.
- Fiscal year 2001: Several historic eyries were monitored – 2 fledglings were documented at the Ninemile eyrie and 3 fledglings documented at the Frenchtown eyrie.

Evaluation: Some aspect of habitat and/or population monitoring is in progress for all Threatened and Endangered wildlife species present on the Forest. Monitoring is done at various levels of detail and through the coordination of several Federal and State agencies.

Monitoring Item 1-6: Big Game Winter Range Habitat Improvement

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Treated acres of big game winter range

REPORTING PERIOD:

5 years

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

Forest must accomplish 75 percent of habitat improvement programmed for a 5-year period with at least 50 percent accomplishment every year.

Introduction: Big game habitat improvement projects implemented during 2000 and 2001 included prescribed burning and aerial application of herbicides to enhance winter range forage.

Methods: Acres of habitat improvement for big game are taken from the Wildlife, Fish and Rare Plants (WFRP) report for 2000 and 2001. The acres of habitat improvement in this report exceed the number of acres of habitat improvement included in the Management Attainment Report (MAR). The WFRP report includes all big game winter range habitat improvement acres whereas the acres reported in the MAR are tied to big game winter range habitat improvement projects accomplished with specific funding sources. Improvement acres include: Mormon Creek Winter Range Weed Control (436 acres aerial

spray), Siegel Pass Winter Range Burn (3,109 acres), and Ranch Creek Burn (included 1,500 acres of winter range) accomplished in 2000 and the Mormon Creek Winter Range Burn (120 acres) and the Puyear Ecosystem Management Burn (835 acres) accomplished in 2001.

Results: In fiscal year 2000, 5,045 acres of big game winter range habitat improvement were accomplished. In fiscal year 2001, 955 acres were accomplished. On average, 2,771 acres of big game habitat per year were improved by prescribed burning and/or herbicide treatment over the last 15 years (1987-2001). This exceeds the Forest Plan projected average of 1,600 acres by 73 percent (see Table 1-6A).

Table 1-6A. Summary of Habitat Improvement Acres 1987-2001 (Actual vs. Projected).

Activity	Plan Projected (Annual Average)	15-year Average (1987-2001)	Percent of Projected
Big Game Habitat Improvement (includes burn and spray projects)	1600 acres	2,771 acres	173%

Elk winter range habitat improvement during the last five years (1997-2001) has exceeded all previous 5-year levels on the Lolo National Forest. Between 1997-2001, 18,408 acres of prescribed burning and herbicide treatment were accomplished. The 5-year actual average of elk winter range habitat improvement from 1997 through 2001 was 3682 acres, which is 230 percent of the Forest Plan projected annual average. Generally, winter range habitat improvement and productivity has been improved beyond Forest Plan estimates during the period 1997-2001. Summer range on the Forest was not limiting for elk during that time and elk numbers on the Forest increased after the severe winter of 1996/1997 to an estimated 12,000 animals (slightly more than the number of elk estimated as the population potential in the early to mid 1980s).

Monitoring Big Game Winter Range Habitat Improvement Projects

Prescribed Burning

In 1999, biologists conducted walk-through surveys of prescribed burns and recorded percent shrub top kill across the landscape, small understory tree mortality, large tree mortality and ceanothus sprouting. Forage production was monitored using ECODATA plots (Hillis and Applegate 1998) during the summers of 1996 through 1998.

Forb production was not monitored on big game winter ranges during 2000 and 2001. See the 1999 Forest Plan Monitoring Report for detailed results for previous monitoring.

Herbicide Application

Mormon Ridge

During Fall 2000, herbicides were aerially applied to the Mormon Ridge area as a follow-up treatment to the 1997 application of Tordon. Because knapweed seeds are viable for 9-10 years, at least 3 "re-treatments" of knapweed-infested areas are necessary (after the original treatment) at 2-3 year intervals. In the 2000 aerial spray application, Tordon was used to target knapweed and leafy spurge and Plateau was used to treat cheatgrass. A walk-through survey by botanists in June 2001 indicated the herbicide application was effective in reducing knapweed and leafy spurge but impacts to cheatgrass were mixed

and varied by application rate. Photo plots were established in October 2001 for future monitoring

Summer/Fall monitoring results of the original aerial spray treatment occurred from 1996 (pre-treatment) through 1999. Total biomass on the site (pre-treatment) was 1,920 pounds/acre. The first growing season after treatment, total biomass was reduced to 1,052 pounds/acre but increased to 2,975 pounds/acre during the second year. Total biomass/acre was about the same after the third growing season as it was prior to treatment. Weed biomass was substantially reduced from 56 percent of the total biomass (pre-treatment) to 2-7 percent in the 3 years following treatment. Forb biomass, initially 26 percent of the total biomass was also reduced (to 2-9 percent of total biomass) in the 3 years following treatment. Grass biomass was substantially increased from 10 percent of the total biomass (pre-treatment) to 85-96 percent in the 3 years following treatment. Additional monitoring was done on plots that were seeded with native grass. Two of the three plots were heavily dominated by cheatgrass. Since native grasses may not germinate for a few years, monitoring will continue for several more years to determine the long-term native grass response.

Partnership Funds: In 2000, the Rocky Mountain Elk Foundation and National Fish and Wildlife Foundation contributed a total of \$14,000 for aerial herbicide spray of noxious weeds on the Mormon Creek Winter Range. In 2001, the Montana Department of Fish, Wildlife and Parks provided a total of \$9,000 for the Puyear Ecosystem Management Burn and the Mormon Creek Winter Range Burn. (Forest Wildlife Partnership Records).

Overall Evaluation: The Forest is exceeding Forest Plan projections for big game habitat improvement in all but the wettest years. Monitoring indicates that prescribed burns increase forage production and herbicide treatments, in areas of heavy weed infestations, significantly increase forage production.

Recommendations: The impacts on herbicides, especially on forbs, should continue to be monitored and subsequent projects should incorporate new findings.

Monitoring Item 1-7: Threatened, Endangered and Sensitive Plants and Plant Diversity

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Review of monitoring projects established by the Lolo National Forest botany program.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Any adverse effects on forb diversity or Threatened, Endangered or Sensitive (TES) plants from project implementation or lack of habitat maintenance or restoration projects.

INTRODUCTION

Information for this item focuses on:

- reporting new sightings of threatened, endangered, and sensitive (TES) plants;
- providing information on existing occurrences;
- and providing the most current information collected from monitoring plots.

The list of sensitive plants for the Northern Region (Region One) of the Forest Service was last revised in March 1999. At that time, seven new plant species were added to the Lolo National Forest sensitive plant list. These seven species are: Beck water-marigold (*Bidens beckii*), watershield (*Brasenia schreberi*), beaked sedge (*Carex rostrata*), iceland-moss lichen (*Cetraria subalpina*), sand springbeauty (*Claytonia arenicola*), western pearl flower (*Heterocodon rariflorum*), and pale laurel (*Kalmia occidentalis*).

In November 2001, the U.S. Fish and Wildlife Service listed Spalding's catchfly (*Silene spaldingii*) as threatened. Potential habitat for this plant occurs on the Plains/Thompson Falls Ranger District of the Lolo National Forest.

Spalding's catchfly is a perennial plant that is primarily restricted to mesic grasslands that make up the Palouse region in southeastern Washington, northwestern Montana, and adjacent portions of Idaho and Oregon. It is typically associated with grasslands dominated by native perennial grasses such as Idaho fescue or rough fescue. Other associated species include bluebunch wheatgrass, snowberry, Nootka rose, yarrow, prairie smoke avens, sticky purple geranium, and arrowleaf balsamroot. Scattered individuals of ponderosa pine may also be found in or adjacent to this plant's habitat. Sites range from 1750 to 5100 feet in elevation.

In fiscal years 2000 and 2001, several new occurrences of sensitive plants were found and several known locations were monitored (Table 1-7A). One reported occurrence could include several observations of a rare plant. For example, common clarkia (*Clarkia rhomboidea*) and clustered lady's slipper (*Cypripedium fasciculatum*) grow in small clusters or groups and several observations of these plants are common in one locale and are reported as one occurrence. An occurrence is unique if it is separated by more than one square mile from another occurrence. In the case of an aquatic plant, an occurrence is unique to a lake, river, etc. An extension of an occurrence is defined as any additional plant(s) found in fiscal year 2000 that occurred within a mile of a known occurrence. An extension does not necessarily mean a population is increasing.

Table 1-7A. Occurrences of sensitive plants that were monitored or found in fiscal years 2000 and 2001.

Plant Species	Common Name	Number of Occurrence(s) on the Lolo National Forest	New or Extension of Known Occurrence(s) for fiscal years 2000 and 2001
<i>Adoxa moschatellina</i>	Musk-root	5	Extension and 4 New
<i>Bidens beckii</i>	Beck water-marigold	3	
<i>Brasenia schreberi</i>	Watershield	2	Extension
<i>Clarkia rhomboidea</i>	Common clarkia	4	
<i>Claytonia arenicola</i>	Sand springbeauty	6	5 New
<i>Cypripedium fasciculatum</i>	Clustered lady's slipper	22	3 New Extension
<i>Grindelia howellii</i>	Howell's gumweed	2	
<i>Kalmia polifolia</i>	Pale laurel	1	
<i>Orogenia fusiformis</i>	Tapered-root orogenia	1	
<i>Trifolium gymnocarpon</i>	Hollyleaf clover	1	Extension
<i>Waldsteinia idahoensis</i>	Idaho barren strawberry	1	Extension

New Sensitive Plant Occurrences

musk-root (*Adoxa moschatellina*): Four locations of musk-root were found in the Rock Creek drainage on the Missoula Ranger District during the summer of 2001. Musk-root plants were found growing in association with moss at the base of talus slopes where a cool flow of air is present. In addition, an extension of musk-root was also located in the Rock Creek drainage 300 feet from an existing occurrence.

sand springbeauty (*Claytonia arenicola*): In April and May 2000, several thousand individual plants of sand springbeauty were located in Falls, Cascade, Siegel, Wallace, Wilson, and Robertson Creek drainages on the Plains/Thompson Falls Ranger District. Plants appeared robust as evidenced by their size and abundance. All plants inhabited northerly aspects and were growing in association with moss over rocky substrates.

Until the spring of 2000, only one population was known to occur in the Cascade Creek drainage, which is between the Falls and Siegel Creek drainages. There are no other known locations of this plant in Montana. This population appears to be on the periphery of its range from the other known populations in Idaho and Washington.

In the spring of 2001, an ecosystem maintenance burn, known as the Wilson Burn, was conducted in the Wilson and Robertson Creek drainages on the Plains/Thompson Falls Ranger District. The Robertson Creek drainage also burned naturally in the summer of 1994. During the 2000 surveys, sand springbeauty was found growing in burned areas with other annual plants like fireweed. The plant appears to be well adapted to fires. Sand springbeauty is an annual that produces several very hard-shelled seeds that probably require stratification periods or extreme temperatures to germinate. Lolo National Forest botanists plan to return to the Wilson Burn area, to look for sand springbeauty plants.

clustered lady's slipper (*Cypripedium fasciculatum*): In May 2000, a single stem of clustered lady's slipper was found in a precommercial thinning unit in Weaver Gulch on the Ninemile Ranger District. The site was harvested in 1964 and almost all the canopy cover was removed with a shelterwood cut. After an extensive search of the area, a total of 76 stems were counted in six separate clusters. Two monitoring plots were established in the thinning unit, and one plot was established outside the treatment area as a control.

On the Superior Ranger District, an estimated two thousand stems were found as an extension of the Tamarack Creek drainage population. These plants were in a proposed prescribe burn area. Three monitoring plots were established in this area. The plots were monitored in 2000 and 2001.

In 2001, two more populations of clustered lady's slipper were found. One population was located on the Superior Ranger District in the Flat Creek Fire (burned in 2000) in the Flat Creek drainage. The other was located on the Ninemile Ranger District in the McCormick Creek drainage. There are currently three known occurrences of clustered lady's slipper on the Ninemile Ranger District, four occurrences on the Plains/Thompson Falls Ranger District, and 15 occurrences on the Superior Ranger District.

Sensitive Plant Extensions And Occurrences Monitored In Fiscal Year 2000

Beck water-marigold (*Bidens beckii*) and watershield (*Brasenia schreberi*): Occurrences of Beck water-marigold and watershield were monitored in July 2000. Both plants are known to occur in Seeley Lake and both have been documented near the Larch Campground since 1967. Both plants were found near the boat launch as well as at the canoe-launching site near the Seeley Lake District office. Beck water-marigold is also known to occur in Lake Alva and Salmon Lake. Watershield is known to occur in Seeley Lake and the Clearwater River.

In August 2001, Lolo National Forest botanists surveyed the entire shoreline of Seeley Lake and found several locations of watershield. The plants were growing in one to three feet of water and were well distributed throughout the lake. Future surveys for this plant on other lakes on the Seeley Lake Ranger District are planned. Boat motors, wave action from boats, entanglement in fishing lures, and water pollution can damage watershield.

hollyleaf clover (*Trifolium gymnocarpon*): In 1991, the Forest botanist found hollyleaf clover growing on an open ponderosa pine hillside in the Rock Creek drainage on the Missoula Ranger District. At that time, the population was documented as covering one to two acres and comprised of at least 2,000 individuals. In April 2000, Forest botanists surveyed this same population and found it scattered across an open hillside covering 20 to 40 acres and containing several thousand individuals. These plants were in various stages of development; some were leafing out and others had bloomed.

This plant occurs on big game winter range. The hillside has been burned in past years to reduce litter buildup of grasses and to increase the vigor and palatability of the grasses for forage for big game animals. The last prescribed underburn that occurred on this hillside was completed in March 2000. The spring burns appear to be beneficial for this plant since the plant is surviving and increasing in numbers. The clover was also seen growing near charred logs.

The Forest is planning to treat noxious weeds with herbicide on this hillside since spot infestations of knapweed occur where this clover grows. To help assess impacts of herbicide treatments on this plant, four monitoring plots were sprayed with one pint per acre of Tordon, the most likely treatment for the hillside, in June 2000. One year later, the plants looked wilted and a 15 to 40 percent reduction of plant stems was counted. Forest botanists will monitor these plots for at least two more years.

Idaho barren strawberry (*Waldsteinia idahoensis*): A population of Idaho barren strawberry occurs in the Lolo Creek drainage on the Missoula Ranger District. This population is the only documented population in Montana and appears to be an outlier population from the neighboring state of Idaho where it is more common.

Idaho barren strawberry grows in moist subalpine fir and grand fir habitats and in meadows nearby. An individual plant was found in a side drainage adjacent to the existing occurrence on National Forest land in May 2000.

common clarkia (*Clarkia rhomboidea*): One population of common clarkia previously known to occur in the Teepee Creek drainage was not located in 2000. Four occurrences are known to occur on the Plains/Thompson Falls Ranger District in Cougar Gulch, Spring Gulch, Weber Gulch, and Ashley Creek.

Howell's gumweed (*Grindelia howellii*): In August 2001, occurrences of Howell's gumweed were monitored, however several occurrences could not be relocated. Two populations are known to occur on the Seeley Lake Ranger District in the Cottonwood and Dunham/Monture Creek drainages.

pale laurel (*Kalmia polifolia*): The population of pale laurel on the Missoula Ranger District at Mary's Frog Pond was checked in the summer of 2001 in association with a field trip with the Montana Native Plant Society. This plant population is healthy.

tapered-root orogenia (*Orogenia fusiformis*): This plant population was checked in the spring of 2000 as part of a field training exercise for surveyors. It is located in the Lolo Creek drainage on the Missoula Ranger District.

METHODS

Management activities that were surveyed and/or monitored in fiscal years 2000 and 2001 include: timber harvesting, prescribed burning, herbicide treatment, and livestock grazing.

To avoid adverse impacts to TES plants, surveys are conducted for those plants with the highest likelihood of occurring in a proposed project area and where proposed activities would have an adverse effect on TES plants if they were present. If a rare plant is found, project mitigation can include protecting the plant by buffering the plant's location from activities. Where only one occurrence is known for a rare plant, this would be the most likely action. However, for those plants where periodic disturbances are necessary for their survival, this is probably not the best action. In order to understand how rare plants respond to management activities (e.g. thinning, underburning, herbicide treatments), Lolo National Forest botanists have established several monitoring plots. Observed results will be incorporated into conservation strategies for these plants.

clustered lady's slipper (*Cypripedium fasciculatum*)

Several occurrences of clustered lady's slipper have been found on the Superior Ranger District in forest habitats, mainly the Douglas-fir/ninebark habitat type. To date, 32 plots have been established which include no treatment (control) and treatment plots. Treatments consist of graze and underburn, thin and underburn, clearcut and underburn, and underburn only. Since 1994, twelve plots have been treated with some type of timber harvest. In fiscal year 2000, nine of the twelve plots were within harvest units that were thinned.

This plant grows in clusters as the name implies. To establish a monitoring plot, a permanent marking stake is placed in the center of a cluster. From the center of the

stake, overhead canopy cover is measured using a densiometer. The percent of understory canopy cover (shrub, grass, and forb) in the plot area is also estimated. Photographs are taken of the surrounding vegetation at the four cardinal directions from plot center. The distance and angle are measured from plot center to the nearest clustered lady's slipper stem. For each stem, Forest botanists measure the longest leaf length, note if the plant is flowering or fruiting, if fruits are fertile or unfertile, note any herbivory of the plant, and also note any other interesting observations (e.g. potential pollinators on the plant). Beginning in fiscal year 2000, the duff layer at each stem was measured.

hollyleaf clover (*Trifolium gymnocarpon*)

In fiscal year 2000, four plots were established at the one known Forest location of hollyleaf clover. These plots are part of a monitoring strategy to help assess the effect of herbicide treatment on hollyleaf clover.

To establish the hollyleaf clover plots, four, two square meter plots were marked with steel stakes at the corners. The canopy cover of all plants present in each plot is estimated. All hollyleaf clover stems are counted, since the plant grows from a branched rootcrown, which makes identification of individual plants difficult. Photographs of each plot are taken and a close-up photograph of a representative hollyleaf plant at each plot is also taken.

Native Plants

In October 1996, five circular plots were established on the Mormon Ridge winter range on the Missoula Ranger District to monitor forb response to herbicide application. This winter range was sprayed with 1.5 pints per acre of Tordon on June 2 and 3 of 1997. The range was resprayed with one pint per acre of Tordon on October 4, 1999. Two plots were not resprayed (plots 3 and 4) and the other three were sprayed. These five plots were monitored in fiscal years 1997 through 2000.

In June 2000, five similar plots were established on the O'Brien winter range on the Missoula Ranger District. Herbicide treatment of this area is planned in the near future. Like the Mormon Ridge plots, the purpose of these plots is to monitor forb response to herbicide treatment(s).

To monitor forb diversity in response to herbicide application on the Mormon Ridge and O'Brien winter ranges, specific procedures for plot establishment and measurement were followed. Five circular plots were established in five separate areas containing no to high (80 percent canopy cover) of spotted knapweed. A permanent marking stake was placed at plot center and a radius of 37 feet was used to establish the plot perimeter for a 0.1-acre plot. Canopy cover of forbs is estimated for each plant. Photographs of the plot are taken at the four cardinal directions from plot center. In fiscal year 2000, a representative close-up photograph of each plot was also taken.

Grass revegetation plots

Three macroplots were established in October 1997, to test the effectiveness of seeding after herbicide treatment and prescribed fire. Two of the three plots were monitored in fiscal year 2000. Each macroplot is 20 by 40 feet and is divided into two 20 square foot plots. Prior to seeding, all plots had good herbicide coverage and few native bunchgrasses. The bunchgrass seed mix was applied at 20 pounds/acre. One plot was trampled after seeding and one was not to determine if trampling promoted germination.

RESULTS

Clustered lady's slipper plots

Three monitoring plots in the Quartz Creek drainage on the Ninemile Ranger District have been monitored since 1995 (Table 1-7B). There are one control (no treatment) and two treatment plots (tree harvest and underburn). Tree canopy cover after the harvest treatment was about 10 percent in both units. The treatment plots are located on a north slope and were harvested in 1997, prior to measuring the plots in July 1997. The burn was done in May 1998, prior to measuring the plots later that month. Some clustered lady's slipper plants had emerged prior to the May burning. After the burn, several burned plants kept growing.

In fiscal year 2000, Quartz Creek Plots 1 and 2 had the highest total number of individuals. Three stems were also seen in Plot 3. In Plot 3, trees provide no cover for clustered lady's slipper and little is provided from shrubs (less than 10 percent). However, there is one inch of duff layer present.

One monitoring plot in the Butler Creek drainage on the Superior Ranger District has been measured from 1996 to 2000 (Table 1-7C). In the spring of 1997, the unit that this plot is in was thinned to feature the large ponderosa pine trees. The canopy cover of trees is about 60 percent in this unit. The canopy cover where this plot is located did not change after thinning. Therefore, this plot is currently acting as a control or nontreatment plot. An underburn is planned here in the near future. An average of one to two inches of duff was measured at the plot.

Table 1-7B. Clustered lady's slipper plots (Quartz Creek) on the Ninemile Ranger District.

Number of Stems						
Plots	7/15/95	7/21/97	5/13/98	8/23/99	7/11/00	8/14/01
Control plot (Plot 1)	44	81	100	37	127	73
Harvest and burn treatment plot (Plot 2)		78	54	81	93	87
Harvest and burn treatment plot (Plot 3)		37	0	0	3	10

Table 1-7C. Clustered lady's slipper plot (Butler Gulch) on the Superior Ranger District.

Number of Stems				
	8/21/96	8/6/97	5/12/98	7/25/00
Thin and burn treatment plot	47	8	45	23

Hollyleaf clover plots

Four plots were established in June 2000. Within these plots, the average canopy cover of hollyleaf was estimated at seven percent and the average number of clover stems was 108. Plots were sprayed with one pint per acre of Tordon after plots were measured. In June 2001, the average canopy cover was 3.5 percent and the average number of stems was 74.

Forb diversity plots

On the Mormon Ridge winter range, the canopy cover of individual forb species in plots prior to herbicide treatment was commonly a trace to three percent. The winter range was initially sprayed with 1.5 pints per acre of Tordon in June 1997 and a larger portion was resprayed with one pint per acre in October 1999. Plots 3 and 4 were not resprayed.

Prior to herbicide treatment, Plot 2 had 60 percent cover of spotted knapweed, ten percent native forbs, and 40-50 percent grass with three percent being cheatgrass. In June 2000, Plot 2 had trace amounts of nonnative and native forbs, and 40-50 percent grass with one percent being cheatgrass. Plots 3 and 4 are similar in vegetation to Plot 2.

Prior to herbicide treatment, Plot 5 had 80 percent spotted knapweed cover, five percent other nonnative forbs, five percent native forbs, and 40-50 percent grass with 40 percent being cheatgrass. In June 2000, Plot 5 had trace amounts of nonnative and native forbs, 95 percent cover of cheatgrass, and a three percent native grass patch. Plot 1 is similar in vegetation to Plot 5.

All native and nonnative forbs were recorded in trace amounts except for one native forb, gray sagewort (*Artemisia ludoviciana*). This plant was 20 percent of the canopy cover in Plot 3.

Forb diversity plots on the O'Brien winter range were established in late June 2000. Yarrow, arrowleaf balsamroot, hairy golden aster and lupine had the highest canopy cover in the plots of any of the native forbs present. Spotted knapweed had the highest nonnative forb cover. Most forbs were present in trace amounts. Forest botanists counted 23 native forbs, 12 nonnative forbs, 6 native grasses, and 6 nonnative grasses.

Grass revegetation plots

Two of the three plots were checked in fiscal year 2000. Plot 3 was not checked. Plot 2 was completely covered with cheatgrass (*Bromus tectorum*) and looked like the surrounding vegetation. Plot 1 did not look like the surrounding vegetation, which was mainly cheatgrass. Plot 1 had 10-25 percent cover of cheatgrass and 50-75 percent cover of other grasses. Most grass cover was provided by slender wheatgrass (*Agropyron trachycaulum*) and mountain brome (*Bromus marginatus*). Also present in less cover amounts were: Idaho fescue (*Festuca idahoensis*), Sandberg's bluegrass (*Poa sandbergii*), junegrass (*Koeleria macrantha*), and annual rye (*Lolium multiflorum*). Idaho fescue has not yet seeded.

Plot 1 differs from the other two plots in that it was established in a burn area. The prescribed burn was performed in March 1997 to reduce litter prior to herbicide spraying.

EVALUATION

Clustered lady's slipper plots

Results from the two control plots show there can be a wide variation in the number of clustered lady's slipper stems naturally from year to year. Therefore, it is important to sample at the same time each year. Plants start to grow by early May and senesce by the end of August. Sampling is best performed in July.

Results from the Quartz Creek treatment plots indicate that clustered lady's slipper plants on north-facing slopes can survive timber harvests that remove most of the canopy cover and burns that do not consume the entire duff layer. Where clustered lady's slipper habitat is at risk to a stand-replacing fire due to an abundance of fuels, treatments that include thinning and underburning should prove beneficial for these plants. Stand

replacement burns typically burn hot and are more likely to consume the entire duff layer as compared to spring underburns.

Some plants take longer to “come back” from treatments. This response is probably dependent on several variables, including how much canopy and duff layer is removed. Therefore, it is important to have long-term monitoring plots when assessing the viability of a cluster of plants.

Forb diversity plots and grass revegetation plots on Mormon Ridge

Herbicide treatments of Tordon at 1.5 pint/acre reduced overall forb diversity (number of plant species) and abundance (number of individuals) for at least four growing seasons (1997-2000). Herbicide application at this rate increases the biomass of desirable native and non-native grass plants.

Forest botanists did not observe any substantial negative impacts to forbs caused by the fall treatment of one pint per acre of Tordon. Beneficial or negative impacts may not be readily seen because of the trace amounts of most forbs being monitored. Plants that appeared to be most negatively impacted were some annual and biennial nonnative plants. Nonnative plants that were recorded in plots previously but were not present this year include: alyssum, nodding chickweed, prickly lettuce, slender forget-me-not, and common mullein. In contrast, six native plants were recorded in plots where they hadn't been recorded in the last year or two. In addition, two native plants were recorded this year that weren't recorded prior to herbicide spraying. These two plants are early bloomers and would not have been detected during the pre-herbicide sampling that occurred in the fall.

Herbicide spraying on ranges with a high cover of cheatgrass and very little native grass component (less than 10 percent canopy cover) will most likely result in more cheatgrass unless areas at risk are revegetated. Revegetation efforts should prove more successful if the area is burned prior to seeding.

RECOMMENDATIONS

Clustered lady's slipper plots

Continue sampling the Quartz Creek plots on the Ninemile Ranger District annually to evaluate long-term results. In 2002, monitor all plots that were established in 2000. Establish new plots when the opportunity arises in areas that will receive treatments not already monitored.

Hollyleaf cover plots

Monitor the plots established in June 2000 for a total of four years.

Forb diversity plots

Monitor the Mormon Ridge and O'Brien plots annually for at least ten years after treatments to determine long-term effects from herbicide treatments.

Grass revegetation plots

Continue monitoring Plot 1 for a total of ten years.

Monitoring Item 2-1: Fish Habitat Improvement

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Improvement of Fish Habitat
REPORTING PERIOD:	5 Years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Forest must accomplish 75 percent of habitat improvement programmed for a 5-year period.

Introduction: The objective of this monitoring item is to determine whether fish habitat improvement projects are being accomplished as planned to maintain or improve fish and aquatic habitat conditions as described in the Forest Plan.

Methods: Fish habitat improvement projects are accomplished with appropriated funding designed to meet target levels established by the Northern Region. Implementation accomplishments are measured in acres of habitat improved per year relative to the target. Annual monitoring is reported relative to Forest-projected accomplishments in the Forest Plan. In addition, the effectiveness of habitat improvement projects is monitored through pre and post habitat quality surveys, fish population monitoring, and qualitative observation. Annual stream surveys across the Forest also measure the long-term effectiveness of land management practices in maintaining and improving aquatic habitat.

Results: Projected fish habitat improvement acres over the 15-year planning period were expected to be about 42 acres per year when the Forest Plan was developed. Over the past 15 years, fish habitat improvement accomplishments for the Lolo National Forest have ranged from 15 to 404 acres of habitat improved per year. In any 5-year period, the percent of the projected improvements accomplished has ranged from approximately 69 percent to 300 percent. Improvements were low in the late 1980s and late 1990s, but generally exceeded expected accomplishments throughout the remaining period. High accomplishments in the early 1990s were over-weighted by totals in 1993 of over 400 acres of habitat improved. In the last few years, assessments have highlighted the fish barrier problem across the Forest, and improvement projects have focused on removing these barriers. In fiscal year 2000, 33.5 miles (56.8 acres) of fish habitat were improved, and in fiscal year 2001, 43 miles (72.9 acres) of fish habitat were improved.

Habitat improvement effectiveness monitoring has been accomplished at some level of intensity for all projects that have been undertaken. Specific results can be found in the annual Fisheries and Aquatic Monitoring Reports for the Forest. The effectiveness of habitat improvement projects has typically been high. Stream channel restoration projects have generally required a minor amount of reconstruction following the first runoff season, but have nevertheless accomplished the objectives of improving habitat. Barrier removal projects are relatively straight forward, and often provide the highest benefit-to-cost ratio in terms of improving large-scale fish population issues. Road obliteration projects are also straightforward and provide long-term watershed scale benefits to fish populations. On the September 21, 2001 Forest monitoring trip to the Deer Creek road decommissioning project, there was discussion on the fact that many of the roads, which are being decommissioned, are not the highest priority for fish habitat need. Although the Forest has a process for evaluating the highest needs, due to limited funding, and other Forest

priorities, there has been a problem completing the NEPA, for many of the Forest's higher priority areas.

The effectiveness of land management practices in maintaining and improving fisheries and aquatic habitat across the Forest has been variable. In general, monitoring of instream sediment levels from 1987 to 1996 showed two things: 1) sediment levels vary inversely with flows (a high flow year results in low surface fines and a low flow year results in high surface fines), and 2) peak sediment levels in streams are relatively higher in watersheds with road development than in unroaded watersheds (the high sediment levels in low water years are higher in roaded drainages than in unroaded drainages for the same year). In addition, a large-scale assessment of fisheries and aquatic habitat conditions relative to roaded and unroaded drainages across the Forest in 1996 indicated that all of the stream parameters measured were impacted to some degree in roaded watersheds as compared to their unroaded counterparts. Instream sediment data collection was discontinued in 1996 because continued data collection is not expected to change the conclusions from the previous 10-year study.

Evaluation: Habitat improvement projects are typically accomplished at acceptable levels relative to Forest Plan projections. There is, however, a large amount of habitat improvement that remains to be accomplished if native fish populations are going to recover. Forest Plan projections were not developed under the current situation where listed fish species and conservation agreements are a more significant issue.

The most significant projects in the next decade will likely be associated with fish barrier removals to reconnect populations. In fiscal year 2002, the Forest began a Forest-wide inventory of culverts to determine which structures are fish barriers. A minor amount of stream restoration is expected to continue as well. Finally, road obliteration projects will probably continue at or above their current levels for several years.

Prior to the signing of the Inland Native Fish Strategy, (INFISH), land management practices in riparian zones and along stream channels was primarily governed by the Montana Streamside Management Zone law. In 1995, with the signing of INFISH, the emphasis in these areas changed to one of primary protection, conservation, and restoration of these areas to benefit native fish species. As a result, activities such as timber sale buffers, road construction, and road/stream crossings have been managed differently, to the benefit of these species. While it often takes several years for the effects of land management practices to show up in changes to aquatic habitats, all indications are that streams and riparian zones will improve as a result of these new guidelines.

Recommendation: The Forest should complete the ongoing fish barrier assessment in fiscal year 2003 and follow up with a Forest-wide prioritization of barriers for removal. This will be useful in revising the Lolo National Forest Plan and setting realistic projections regarding habitat improvement project levels in out-years that will achieve the goal of native fish restoration.

Efforts to reduce road densities across the Forest should be continued, and increased, where practical. While the direct benefits of recent road reduction efforts are hard to quantify at this time, an abundance of literature exists which points to roads as one of the largest single contributors to degraded aquatic habitats.

INFISH standards and guidelines should be incorporated and built upon to continue the improved management direction in riparian zones that has resulted from their inception in 1995. The Lolo National Forest should continue to refine and formalize the Riparian Management Objective (RMO) measures specific to this Forest that were developed in 1996.

Monitoring Item 2-2: Aquatic Habitat and Fish Population Assumptions

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Validation of aquatic habitat quality and fish population assumptions in Forest Plan. These were used to predict effects of management activities and evaluate actual effects.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	A decline in aquatic habitat/fish population for more than one year.

Introduction: The objective of this monitoring item is to determine whether assumptions in the Forest Plan regarding the effect of management activities on fish habitat and populations are accurate. An additional objective is to track fisheries and aquatic habitat conditions over the planning period.

Methods: The basic assumption tied to the existing Forest Plan is that management under the standards, guidelines, and projected outputs in the Forest Plan would provide for maintenance and improvement of fisheries and aquatic habitat across the Forest. While standards and guidelines have generally been met, projected outputs have not been at the level expected in many areas, so it is difficult to test this assumption. However, by utilizing stream survey data collected over the last 15 years, resource specialists can determine whether fisheries and aquatic habitat conditions have been maintained or improved at the output levels that did occur. In 1996, fish population and habitat conditions were assessed based on this data in roaded and unroaded drainages as a surrogate for management activities (Riggers et al. 1996). In addition, extensive information on bull trout distribution, movement patterns, and life history traits has been collected through Forest surveys, special project monitoring, and cooperative research efforts with Montana Department of Fish, Wildlife and Parks. Finally, Inland Native Fish Strategy (INFISH) Implementation and Effectiveness Monitoring activities began in 1999 and have continued at various levels for the past 3 years. This information displays how Forest Service management is affecting stream habitat.

Results: Since the original Forest Plan was completed, both of the dominant native salmonids on the Forest have been petitioned for listing under the Endangered Species Act. Bull trout were listed as threatened in 1998, and westslope cutthroat trout are currently in review status. At the same time, populations of some exotic species have increased and expanded their distributions across the Forest. Non-native rainbow and brown trout populations in larger rivers are healthy for the most part, as are brook trout populations in Forest tributary streams. Northern pike have significantly increased in numbers and distribution. All of these exotic populations threaten native fisheries in many areas. In addition, whirling disease has become an important factor in many larger rivers. While populations of non-native species and disease outbreaks off National Forest System lands are not entirely within the agency's capabilities to manage, they nevertheless have

significant impacts on native fish populations and community dynamics both on and off the Forest.

Habitat conditions were rated across the Forest in 2000 through the Bull Trout Consultation Section 7 Baseline Watershed Assessment. At a gross scale, this assessment showed that many parameters were functioning at risk or functioning at unacceptable risk relative to bull trout habitat needs. Those parameters in particularly poor shape were sediment, large woody debris, pool size and quality, width:depth ratios, and refugia habitat availability. Road densities were also assessed to be high throughout many watersheds, contributing to these habitat conditions. Most of the watersheds on the Forest were described as functioning at unacceptable risk when species and habitat conditions were integrated. Similarly, the 1996 analysis of fisheries and habitat conditions in roaded and unroaded drainages across the Forest showed an overall degradation of all habitat parameters in developed watersheds. Of particular note in this analysis, were the significant difference in bank stability in roaded and unroaded watersheds and the relationship between road densities and sediment in stream channels.

Bull trout populations in the middle Clark Fork system are weak overall. Cooperative radiotelemetry studies with the Montana Department of Fish, Wildlife and Parks, however, have identified several very important tributary streams in Rock Creek, Rattlesnake Creek, and the Blackfoot River that still maintain relatively strong spawning populations. They have also provided important information regarding migration patterns and timing, and the significant negative effect that dams such as Milltown and Rattlesnake have on these populations. This information is critical in allowing the Forest to focus habitat restoration work and more effectively plan land management activities to benefit bull trout. These same activities also typically benefit westslope cutthroat trout in the same systems.

INFISH Implementation and Effectiveness Monitoring results are preliminary at this stage, however, there will be some useful information that comes out of them, especially for large-scale land management planning such as the Forest Plan revision process. The effectiveness monitoring, conducted by a separate monitoring group, is assessing habitat conditions associated with grazing allotments, and also conditions associated with reference, or “undisturbed”, reaches. The undisturbed reach data will be extremely useful in developing habitat potentials and historic ranges of variability in Forest Plan revision. Implementation monitoring, at this point, is a “report card” filled out by District resource managers. To date, the Lolo National Forest has had good implementation scores (see IIT Monitoring Reports for more specific information).

Evaluation: Overall, the 1996 analysis and the 2000 Bull Trout Baseline Section 7 Watershed assessment indicate that habitat conditions and native fish populations across the Forest have not been maintained throughout the planning period. As previously mentioned, many habitat responses have an associated lag time between the land management activity and the change in habitat associated with the activity, and it is therefore difficult to determine whether these reductions in habitat quality are a result of guidance in the existing Forest Plan or activities planned or implemented prior to the development of the Plan. For example, large woody debris levels in streams across the Forest are lower than desired for maintaining high quality pool habitats. This is largely a result of valley bottom timber harvest and stream channel clearing that occurred in the late 1960s through the late 1980s. Land management under the INFISH guidelines protects streamside and valley bottom trees, yet the effect from these past activities is very evident in stream systems across the Forest. Similarly, extensive road construction in the late 1970s through the 1980s has created sediment problems and fish barriers in many streams, but current land management activities typically eliminate more roads than they construct. However, erosion from existing roads, whether a result of inadequate drainage or lack of maintenance due to low budgets, is an existing problem associated with current management of these systems.

The Roads Analysis Procedure, effective January 12, 2001, will be an effective tool for assessing the current road system and the Forest's abilities to maintain this system, and result in the development of long-term planning goals to reduce impacts to fisheries and aquatic habitats. Similarly, the Forest-wide culvert assessment will allow resource specialists to prioritize barrier removals, thereby improving connectivity for native fish populations. Through continued cooperation with the Montana Department of Fish, Wildlife and Parks, the Lolo National Forest will develop more information on westslope cutthroat and bull trout populations and habitat needs.

Recommendation: The Forest should continue to refine the roaded and unroaded watershed analysis to accurately describe habitat condition potentials and ranges in streams across the Forest. The INFISH monitoring data will be valuable data for this effort. Special emphasis should be focused on large woody debris, stream temperatures, pool quality, bank stability, sediment, refugia habitats, and connectivity, and the maintenance of the watershed processes that create healthy, resilient valley bottoms and riparian zones. This analysis may also allow for comparison of varying levels of land management activities to, at a broad scale, assess the effect of these practices on aquatic habitat and determine acceptable levels or ranges while still providing for native fish habitat needs.

Continued cooperation with the Montana Department of Fish, Wildlife and Parks in developing further information on native species population trends and habitat requirements is essential. In addition, the Forest should attempt to become a larger player working cooperatively with Montana Department of Fish, Wildlife and Parks in the management of brook trout populations across the Forest. These fish compete with native cutthroat and bull trout in tributary streams, and have a direct effect on populations of these natives. Management plans, which address brook trout populations, especially in source lakes high in the watersheds, could provide significant benefits to native populations.

Monitoring Item 2-3: Riparian Activities and Effects

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assessment of riparian activities on riparian dependent resources
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Visible or measurable decline in aquatic habitat/fish population for more than one year

Introduction: The objective of this monitoring item is to determine whether activities within riparian areas are affecting riparian dependent resources, particularly fish populations and aquatic habitat.

Monture Creek is a major tributary to the Blackfoot River and a stronghold for bull and cutthroat trout. Dunham Creek is a major tributary to Monture Creek and a primary trout migration route. In the mid-1960s, about a mile of the Dunham Creek valley bottom was

extensively logged. The logging spanned almost the entire valley bottom and removed all trees and the majority of shrubs. A road and bridge bisected the valley, allowing access to both sides of Dunham Creek.

The riparian vegetation provided deep root systems to bind and hold the stream banks intact and allow continual recruitment of large woody debris into the creek. As a result of tree removal, stream bank stability and energy dissipation capabilities within the channel were reduced. The stream could not retain its dimension and meander pattern. This resulted in chronic erosion of the banks and high concentrations of sediment deposition to downstream portions of the stream.

During the 1970s, well-intentioned attempts were made to stabilize the disturbed reach. Berms were placed all along the stream and it was channelized into a trapezoidal cross-section both upstream and downstream of the narrow bridge crossing. Since that time the berms breached many times, bank erosion was prevalent, and the stream remained very unstable.

Over time, natural vegetation slowly established itself along portions of the bank, floodplain, and low terraces. Willows, alder and other riparian vegetation occur intermittently along the stream bank. Conifer trees 10 to 25 feet tall revegetated the floodplains and low terraces. During the spring of 1997, flooding occurred which interrupted and set back the recovery process. Young trees and shrubs along the creek did not yet have the deep, strong root systems necessary to stabilize and hold the stream banks and there was no wood in the channel to dissipate energy.

Because of both stream instability and insufficient width, Dunham Bridge washed out in the 1997 flooding. This failure led to further bank erosion and high levels of sediment deposition downstream. Lower reaches of the stream filled with excess sediment and caused the stream to re-route during subsequent spring flood events. This, in turn, resulted in road problems downstream. Because of the instability of the stream, as well as the risks and costs associated with reestablishing the bridge, a decision was made in 1998 to abandon the crossing.

Methods: In the summer of 1998, Montana Department of Fish, Wildlife and Parks (MFWP) collected extensive fish population and distribution data in the Blackfoot River Basin and determined that bull and cutthroat trout populations in several reaches of Dunham Creek were very low. In addition, the reach described above had intermittent flow and was very unstable. MFWP was concerned that the unstable reach was causing considerable increases in sediment delivery, poor fish habitat, and an altered migration corridor. MFWP contacted the Lolo National Forest, inquiring about the feasibility of a geomorphic assessment of Dunham Creek. MFWP wanted to know: (1) why the situation existed, (2) was it naturally occurring, and (3) were rehabilitation measures warranted. MFWP was working with the Big Blackfoot Chapter of Trout Unlimited and the U.S. Fish and Wildlife Service (FWS) to rehabilitate private lands downstream of Dunham Creek. Assessing this section of Dunham Creek was a necessary link to downstream recovery efforts.

In the fall of 1998, Lolo National Forest began collecting data on Dunham Creek. Data collection and site surveys continued in 1999, including a geological and seismic assessment. Data collection and site reconnaissance lead to the following conclusions: (1) past timber harvest and stream channelization in the 1960s and 1970s caused about 6200 feet of stream to become highly unstable as compared to reference stream reaches; (2) the subject reach most likely was intermittent naturally, but the spatial and temporal extents had been altered due to human-caused stream instability; (3) sediment deliveries due to bank erosion were orders of magnitude above natural delivery rates and were producing a high risk to downstream conditions; and (4) the subject reach was slowly

recovering as the area re-vegetated, but stream instability would continue at undesirable rates for at least 50-100 years.

There was a need to restore the natural curves and meander patterns, the width and depth of the stream, and its relation to the floodplain. There was a need to reduce sediment sources to natural levels and restore the natural gradient of the stream. There was a need to add woody debris to the channel to provide for energy dissipation.

The Lolo National Forest designed a detailed rehabilitation plan. The intent of the design was to temporarily (10-15 years) stabilize all sections of the subject reach that had become unstable so that the subject reach could return to near its recent historic position within the valley.

Results: These conclusions were shared with MFWP and with FWS. MFWP and FWS contacted the Seeley Lake District Ranger, and requested that the Forest consider the subject reach of Dunham Creek as a priority in the Forest watershed restoration program. Trout Unlimited offered to fund design efforts if the Forest would fund the environmental assessment. The Lolo National Forest, Trout Unlimited, MFWP and FWS entered in to Partnership to fund and implement a rehabilitation design for the disturbed reach of Dunham Creek.

The project was implemented in two phases in order to maximize revegetation success. Phase one included the initial reconstruction, which occurred between July and September 2001. Phase two involved revegetation and transplanting, which occurred in the fall of 2001 and spring of 2002, when climate conditions are more favorable to transplant survival.

Evaluation: Implementation involved stabilizing streambanks, reconstructing meanders, riffles, and pools, recontouring banks, shaping the channel, removing berms, and replacing large woody materials. The design sized the rehabilitated channel to convey water and sediments through the reach without impacting water surface elevations or stability relative to the up- and downstream reaches.

Particular attention was placed on habitat complexity, channel complexity, and the revegetation plan. Every portion of trees used for rootwads were incorporated into either stabilization or habitat components. Streambanks were made to be irregular and complex. Use of rock was limited to that necessary for short-term stability.

Recommendations: Monitoring will determine the need, species, and quantities for additional vegetation during the next 3-5 years.

Monitoring Item 3-1: Management Practices and Natural Hazards

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Insure management practices minimize hazards from floods, wind, wildfire, erosion, and other natural physical forces.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Anticipated problem identified in interdisciplinary team review of timber sale.

Introduction: Wildfire is one of the key disturbance processes affecting vegetation and related resources on the Lolo National Forest (USDA Forest Service 1996). Virtually all of the vegetation on the Lolo National Forest is a component of a fire-adapted ecosystem where fire recycles nutrients, regulates forest succession, maintains diversity, reduces biomass, controls insect and disease populations, and maintains biological processes (Keane et al. 1999). The fires of summer of 2000 were the primary natural forces at work on the Forest during this reporting period.

Methods: The Southwest Montana Zone Fire Season 2000 Report and the Lolo National Forest Burned Area Assessment 2000 Report provided information on the incidence and effects of that year's fires. The history of fire on the Lolo National Forest and associated fire regimes was obtained from numerous other reports. Davis and others summarized fire ecology information in relation to habitat types in 1980. In 1991, Barrett reviewed fire history and fire regime types in the Clark Fork River corridor for the Superior Ranger District. In 1993, Losensky provided an overview of factors influencing fire regimes within major cover types in the Northern Region and described 1900-era age class distribution. The Lolo National Forest assessed fuels management issues relating to the role of fire in the forest in 1996 (USDA Forest Service 1996). In 1999, Lolo National Forest wildlife biologists analyzed average annual acres burned in pre-settlement times as part of an evaluation of black-backed woodpecker habitat (O'Connor and Hillis 1999). These and other sources were used to develop a range of acreages that would have burned in the pre-settlement landscape.

Results: The effects of fire are quite different in different vegetation types. Vegetation is grouped into 5 broad vegetation response units (VRUs). VRUs are a combination of habitat types of similar vegetative components (Pfister et al. 1977) and fire regimes (Fisher and Bradley 1987).

VRU 1, non-forest, grass and rock, was dominated by non-forest areas prior to Euro-American settlement with a mixture of native grasses, forbs, and rocks.

VRU 2, warm and dry lower slopes, includes the driest forested sites that were assessed in this report. On these landscapes, healthy forests formerly occurred in response to relatively frequent, non-lethal, low intensity fires (Arno 1980, Agee 1993). As a result, surface fuels and coarse woody debris would typically have been light (Graham et al. 1994). Large diameter, fire-resistant ponderosa pine, Douglas-fir, and occasional western larch were well adapted to these disturbances and often would have been found as old individual trees or in old growth stands. It would have been unlikely that more than 10-20

percent of the overstory trees were killed in a typical fire, and extremely unlikely that more than 60 percent of the overstory trees were killed.

The native vegetation in **VRU 3, moist midslopes**, and **VRU 4, cool and dry upper slopes**, would have been dominated by stands of primarily seral species as a result of periodic stand-replacing fires. Species would have included those well adapted to high severity fire, such as lodgepole pine, ponderosa pine, western larch, and whitebark pine. Fire history studies found low and moderate severity fires visited these VRUs between stand-replacing events. Those fires created less continuous fuels and smaller patch sizes while favoring seral species. Some reports have identified an intricate mosaic of vegetation in portions of these VRUs (Arno et al. 1993), and suggested that the reduction in low and mixed severity fires due to fire suppression in the past century created more continuous fuels and larger patch sizes than existed previously.

VRU 5, cold upper elevations, experienced a variety of burn severities, dominated by high severity, stand replacing burns. Fires that burned at these severities created a variety of future vegetation conditions. Some areas would not reforest for years and would remain in prolonged alpine meadow, brush, grass, or forb conditions. Others readily reforested.

Historic fire perimeters have been mapped from 1840 through 1980 (Losensky, 1993). The earlier period mapping likely only represented the high severity fire activity. When the 1910 map is overlaid with the fire perimeters of 2000 it is interesting to note that very little fire activity from the early part of the century is recorded within the fire perimeters of 2000. Another important point is the fire perimeters were significantly greater in size in the early part of the century. The large-scale 1910 fires did not specifically affect the stands that were burned in 2000.

Approximately 47,000 acres burned on the Lolo National Forest in VRUs 2, 3, 4 and 5 in the summer of 2000. That acreage is high compared to acreages burned during the last 25 years, when the acreage burned/year averaged only 800 acres. Burns of 47,000 acres are small compared to fires that burned in 1889, 1910, and 1919. Losensky calculated that the mean acreage burned on the Lolo National Forest prior to successful fire suppression, was 39,000 acres/year. Consequently, the fires of 2000 on the Lolo National Forest were relatively "normal" compared to the historic mean. The Canyon Creek Fire in 1988 burned more than 70,000 acres on the Lolo National Forest. Consequently, that event might be described as slightly higher-than-normal. In excess of 300,000 acres burned on the Bitterroot National Forest in 2000. Hillis and others (in prep) concluded at the Regional scale, that the fires of 2000 were approximately 2.5 times greater than the historic mean, but again were in no way comparable to the magnitude of such historic events as the fires of 1889 or 1910 (Losensky pers. comm.).

Table 3-1A. Fire History by VRU

VRU	Acres	Fire intervals	Mean fire interval	Acres that might have burned in a 120-year period
2	648,000	10-50 years	25	3,110,000
3	635,000	25-300years	150	510,000
4	320,000	20-200	80	480,000
5	94,000	50-300	200	60,000
Total	1,697,000			4,160,100

VRU 1 acres are not included in the above estimates because it is difficult to estimate fire return intervals in the wide variety of vegetative conditions represented by VRU 1.

The portion of the Lolo National Forest that faces the most change from the fires of 2000 appears to be VRU 2. Fire suppression and logging of larger trees created stands that are more densely stocked with smaller diameter trees in this VRU. Amounts of surface fuels are also higher in this VRU. Approximately 12,000 acres of VRU 2 experienced higher intensity fires in 2000 than the historic regime of non-lethal, low intensity fires. These findings are consistent with other reports of high-intensity burning in dry forests in the Western U.S. where pre-1900 fires were mostly of low intensity (American Forests 1995; Arno 1996; Quigley and Arbelbide 1997).

VRU 3 and 4 burned in a variety of severities, as would have been expected in the pre-settlement fire regime.

VRU 5 also experienced a variety of burn severities; dominated by high severity, stand replacing burns. This falls within the expected historical range.

The fires of 2000 affected vegetation in different ways, benefiting the ecosystem most in VRUs 3, 4 and 5. The fires favored shrubs and seral tree species, such as aspen, western larch, lodgepole pine and whitebark pine, which depend on stand replacing disturbances. This benefit was limited to the burned acres.

Several factors combined to define the extent of the 2000 fire season for the Northern Rockies and the Lolo National Forest. The first and foremost was the weather. A dry winter and spring progressed into a warm and exceptionally dry summer. The second was extraordinarily dry vegetation, both live and dead, that fueled the growth of large fires. The third was the unprecedented, at least in recent decades, number of large fires burning simultaneously across the West and draining firefighting resources.

The 2000 fire season actually got its start in 1998 when a deepening pool of cold water in the Pacific Ocean, often referred to as La Niña, began to modify weather patterns of the western United States. As a result of La Niña, lower than normal precipitation in the autumn of 1999 added little moisture to the fuels dried during the summer and early fall of 1999. Winter precipitation also was less than normal over much of the area. Low and mid elevation spring snowpack was less than 70 percent of normal over vast areas of the western United States. In the western half of the Northern Rockies, lower elevations lost their snowpack in early February, while the eastern half of the area never really had a lower elevation snowpack. This resulted in an early spring "green-up" of vegetation in many areas.

Sporadic and generally lighter than normal spring rains did little to relieve growing drought conditions. However, spring showers were enough, when combined with the early "green-up," to create an abundance of grass and other light vegetation in some locations. These grasses, forbs, and shrubs cured in the late spring and early summer and added to the fuel layer available to burn. Throughout the spring of 2000, drought conditions intensified throughout the West.

The persistent trend of below normal precipitation dried out both live and dead vegetation. The moisture content of live vegetation dropped to critical levels. These exceptionally dry moisture levels for live vegetation had the effect of adding significant amounts of flammable vegetation to areas that are often green enough to impede fire spread. The situation was much the same, if not worse, for dead vegetation. The moisture content of one, ten, and thousand hour fuels reached record lows in many areas.

On National Forest System land, fires burned in Wilderness areas, roadless areas, areas managed for recreation, and areas managed for timber or forage production. At this point in time, there is no obvious causal relationship, or even correlation, between management

history and where fires burned. However, there are numerous anecdotal examples of where previous fires, both prescribed and wildfires, and other land management actions had a dramatic effect on the spread and intensity of individual fires in 2000.

Evaluation: Over the last 100 years or more, human settlement patterns, fire suppression efforts, and other land use practices, have led to significant changes in historical fire regimes. These changes are most evident in the high frequency/low severity fire regimes such as warm, dry forests historically dominated by ponderosa pine. The ponderosa pine forests often were characterized by relatively open stands of large pines with few small trees. Frequent fires perpetuated these characteristics by killing smaller trees and seedlings, while the large, thick-barked ponderosa pines survived. In recent decades, fire suppression and the harvest of large trees have altered the structure and composition of these forests. Today, many of these areas are much thicker forests dominated by more shade tolerant, and less fire resistant tree species, such as Douglas-fir and grand fir. These changes of forest and grassland composition and structure have also altered the general fire regime from frequent, low intensity fires to less frequent and often more intense fires.

Changes in land use practices also affected some cooler and moister forests. While these forests burned less frequently than drier forests, the infrequent fires resulted in a diverse mosaic of forest patches that varied in age. When fires did occur, older patches with relatively high fuel loads burned intensely. Some of the patches of younger trees with lighter fuel loads burned less intensely or not at all. This shifting mosaic of different aged forest patches often limited the overall size and general intensity of fires in these forest types. In recent decades, fire suppression has tended to homogenize some of these landscapes to a point where fewer younger patches exist to alter fire spread patterns and overall intensity. As a result, fires may burn more intensely and over larger areas than they would have if the natural fire regime had not been suppressed.

The U.S. Forest Service Rocky Mountain Research Station evaluated changes to the composition and structure of fire-adapted ecosystems throughout the continental United States. Their ongoing research categorizes current vegetation conditions into three classes. These classes are defined in terms of departure from the historic fire regime, as determined by the number of missed fire return intervals and the current structure and composition of vegetation resulting from the alterations to the fire regime (Table 3-1B). The relative risk of fire-caused losses of key ecosystem components increases for each respectively higher numbered condition class, with little or no risk at the Class 1 level.

Table 3-1B. Vegetation Condition Classes.

DEFINITIONS OF VEGETATION CONDITION CLASSES	
Condition Class 1	Fire regimes are within or near an historical range and the risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by one or more return intervals. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies

DEFINITIONS OF VEGETATION CONDITION CLASSES	
	have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range.

This research reveals that on National Forest System lands in the Northern Region less than 30 percent of land is in condition class 1. Fire regimes have been moderately altered (condition class 2) from their historical range on roughly 30 to 40 percent of the area of these National Forests. Scientists estimate that another 30 to 40 percent of these lands are in condition class 3, where fire regimes have been significantly altered and the risk of losing key ecosystem components is high. In these areas, changes in vegetation conditions can result in dramatic changes to fire size, intensity, severity, and landscape patterns.

The ecosystems of the Northern Rockies and the natural resources they sustain, evolved with fire. Fire is essential to maintain the proper ecological functioning of these systems. However, uncharacteristically intense fire can significantly alter the short-term and, in some cases, the long-term productivity of soils, watersheds, and vegetation communities. Moreover, these changes can damage or destroy the benefits, such as clean water, fish and wildlife, recreation, wood products and livestock forage, which people derive from these ecosystems.

The erosion and hydrologic response in watersheds from a fire which results in moderate-high severity burned areas is usually dramatically larger in the short-term than that which would normally result from existing road management and timber harvest activities. However, the effects from a fire which severely burns an area is not permanent and often produces a flux of materials (e.g., wood and sediment) that is processed in a way that will create higher quality, more productive stream conditions.

While many wildfires cause minimal damage, some fires cause damage that requires special efforts to prevent or reduce impacts to land, people, or downstream property. High fire severity results in lost vegetation and litter and may produce water repellency in the soil. The resultant loss of protective ground cover exposes soil to erosion and increases runoff volumes. Increased water runoff may cause flooding and higher volumes of sediment to move downstream. Adverse effects, such as increased sediment in reservoirs and reduced water quality, can put community water supplies at risk or impact endangered aquatic species. Debris torrents may be triggered on steep, landslide prone terrain.

Recommendations: At mid and upper elevations, the fires of 2000 burned as would have been expected in pre-settlement times, creating conditions to which native plant and animal species are well adapted. At low elevations, fires burned more severely than would have been expected pre-settlement. These burned areas will remain “outside the range of natural variability” for a long time. This is because:

- Young even-aged forested stands, unlike the older, uneven-aged stands of pre-settlement periods, will occupy large portions of the landscape.
- Very high amounts of coarse woody debris will be present for several decades, increasing the risk of additional severe fires.
- It will take many decades to re-establish old trees in these stands.

In spite of the ecological benefits of the fires of 2000, the Lolo National Forest retains a significant deficit of acres that are “overdue” for fire. As a result, the forest remains

unhealthy and less resilient to future disturbances. This condition is unprecedented, the consequences are largely unpredictable, and conditions are outside the range of natural variability to which these ecosystems are adapted. Healthy conditions will be increasingly expensive to restore but efforts must be initiated as soon as possible.

Most burned areas will regenerate naturally. The Forest has made plans for reforestation of burned stands, particularly those burned stands that no longer have a seed source for shade intolerant ponderosa pine and western larch, and is evaluating other treatments that are necessary to promote recovery within the burn.

Increases in runoff and large sediment pulses are normal hydrologic responses in severely burned watersheds. On landscapes with many roads and stream crossings, standard drainage practices may be insufficient. Immediately after the 2000 fire season, a Burned Area Emergency Rehabilitation assessment recommended a series of immediate stabilization and preventative treatments. Nearly 50 miles of non-system roads received some form of erosion control. Where these roads crossed intermittent or ephemeral draws with undersized or no culverts present, the road fill was pulled back to pass runoff. On system roads, about 40 culverts were replaced with larger capacity structures. And 3,700 acres of the most severely burned areas were aerially seeded with fast growing, short-lived annual grasses to protect fragile surface soil. These treatments addressed what were considered "emergency" needs right after the fires. Numerous longer-term watershed recovery measures have been identified as necessary in the Lolo National Forest Burned Area Assessment 2000 report and Post Burn Environmental Impact Statement.

Monitoring Item 3-2: Temporary Road Revegetation

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Insure establishment of vegetation on temporary roads within 10 years.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management standard to scarify and seed all temporary roads.

Methods: Annual Forest Plan monitoring trips are a source of information for this monitoring item as well as unscheduled Forest reviews of timber sale areas. District timber sale administrators provide the Forest timber sale program manager with the number of temporary road miles constructed and reclaimed.

Results: Forest timber sale administrators reported that 4 miles of temporary roads were reclaimed and reseeded in both fiscal years 2000 and 2001.

Evaluation: The management emphasis for at least the last decade has been to reclaim, seed and fertilize all temporary roads when they are no longer needed. Monitoring has been limited to current road closures and seeding. An assessment to specifically view temporary road reclamation after a 10-year period has not been completed.

Recommendation: An annual sampling of temporary roads constructed 10 years previous could determine the success of revegetation more specific to the activity to be measured for monitoring. This would assess how well the initial temporary road revegetation had progressed after 10 years.

Action Item: In fiscal year 2003, review a sample of temporary roads that were constructed a minimum of 10 years ago.

Monitoring Item 3-3: Management Practices and Multiple Use

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure silvicultural prescriptions met multiple use goals.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship.

Results: No departures from management direction were found.

Evaluation: Silvicultural prescriptions are prepared to meet specific management goals. Minor deviations have been observed within the 15-year period. All deviations resulted from improper silvicultural prescription implementation. Almost all deviations did not meet Forest Plan requirements for downed woody debris and snag retention. These concerns lead directly to workshops involving silviculturists, researchers and other resource specialist to strengthen the silvicultural diagnosis and prescription documentation process and drafting of the publication, the *Lolo Woody Debris Resource*.

Recommendations: Continue the current monitoring effort. There are times when Line Officer's decisions may specify treatments outside Forest Plan guidelines, for example requiring less than the desired amount of coarse woody debris due to overarching urban interface fuels objectives. In such cases, the silvicultural prescriptions should indicate the variation from guidelines, as well as the purpose and/or benefits of this variation.

Action Item: Incorporate direction for timing of achieving wood debris loadings into the draft Lolo Woody Debris Guidelines and finalize these guidelines in fiscal year 2002.

Monitoring Item 3-4: Silvicultural Prescriptions Consider More Than Economics or Outputs

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure silvicultural prescriptions are not primarily chosen on the basis of greatest dollar return or greatest timber output.
REPORTING PERIOD:	2 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship.

Results: There were no departures from management direction.

Evaluation: No major departure from management direction occurred in the monitored silvicultural prescriptions over the 15-year period. Some silvicultural prescriptions implemented the most economically efficient alternative, but the alternative was not selected solely based on the greatest dollar return. These silvicultural prescriptions directly addressed the needs of ecosystem management and achieving Forest Plan objectives. In order to restore or maintain the desired ecosystem conditions, many prescriptions have increased implementation costs, as compared to previously accomplished treatments. Monitoring teams have also found that many selected alternatives did not return the greatest dollar or timber output. Cost effectiveness remains a significant issue to be assessed during the environmental assessment and silvicultural prescriptions process.

Recommendation: Continue the current monitoring effort.

Monitoring Item 3-5: Residual Trees and Adjacent Stands

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure silvicultural prescriptions consider residual trees and adjacent stands.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship.

Results: There were no departures from management direction.

Evaluation: Minor departures from management direction, which would initiate further evaluation, have occurred over the 15-year period. All but one departure was related to diseased tree treatment. The one departure, an implementation deficiency, occurred for failing to retain specific numbers of trees. Almost all departures were documentation omissions. Refer to Lolo Forest Plan Timber Sale Monitoring 1950/2450 memos dated December 15, 1988; November 14 & 15, 1989; October 30, and November 5 & 6, 1990; November 27, 1991; October 19 & 26, 1992 and November 30, 1993.

Recommendation: Continue the current monitoring effort.

Monitoring Item 3-6: Silvicultural Prescriptions are Practical

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure silvicultural prescriptions are practical.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation

treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship.

Results/Evaluation: There were no major departures from management direction.

No deviation has occurred within the silvicultural prescriptions monitored during the 15-year period (fiscal years 1987 through 2001).

Recommendation: Continue the current monitoring effort.

Monitoring Item 3-7: Harvest Size Limit

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Assure silvicultural prescriptions meet legal size requirements.

REPORTING PERIOD:

Annual

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

Departure from management standards restricting clearcut to less than 40 acres.

Method: All silvicultural activities are reported in the Timber Stand Management Record System (TSMRS). The Forest Silviculturist queries this data for even-aged harvested units exceeding 40 acres reported during fiscal years 2000 and 2001.

Results: No even-aged harvest units exceeded 40 acres during fiscal years 2000 and 2001.

Evaluation: Twenty even-aged harvest units have exceeded 40 acres during the 15-year period (fiscal years 1987 through 2001). These harvest units occurred within timber sales evaluated in 1987, 1988, 1989, 1993, 1995, 1996, 1997 and 1999. All units met management standards for units exceeding 40 acres.

Recommendation: Continue the current monitoring effort.

Monitoring Item 3-8: Plant/Animal Community Diversity

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure selected sale alternative provides for plant/animal community diversity.
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Introduction: This is a 5-year reporting item. It was last summarized in the 1999 Forest Plan Monitoring and Evaluation Report and is not summarized for this monitoring report. Plant and animal community diversity will be addressed in the Forest Plan revision beginning in 2003.

Monitoring Item 3-9: Harvest on Timber-Unsuitable Lands

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure harvest on unsuitable lands will meet other resource needs.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: All silvicultural activities are reported in the Timber Stand Management Record System (TSMRS). The Forest Silviculturist queries this database for harvested units by management area (MA).

Results: During fiscal years 2000 and 2001, 151 acres were harvested on timber unsuitable lands for big game winter range improvement. Within campgrounds and others areas of concentrated public use, 105 acres were harvested to improve the recreational setting.

Evaluation: There were no departures from management direction.

Recommendations: Continue the current monitoring effort.

Monitoring Item 3-10: Harvest Level

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure timber sold does not exceed allowable sale quantity for 10-year period
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from 10-year allowable sale quantity

Methods: Fiscal years 2000 and 2001 timber sale volumes reported below were obtained from the periodic timber sale accomplishment report.

Results: The Lolo National Forest has not exceeded the average annual Allowable Sale Quantity (ASQ) in the 15-year period of the Forest Plan; refer to Table 3-10A. On an average annual basis, regulated volume is 40 percent of the 107 million board feet (MMBF) ASQ.

Table 3-10A. Actual vs. Projected Timber Volume Sold, 1987-2001.

Activity	Forest Plan Projected Annual Average (MMBF)	Actual Annual Average (MMBF)	Percent of Projected
Regulated Volume Sold	107	43	40%
Unregulated Volume Sold	15	6	40%

As in previous years, timber sale volumes sold in 2000 and 2001 did not exceed the average annual ASQ. Regulated volume sold in 2000 was 12.0 MMBF, 11 percent of the 107 MMBF average annual ASQ. Regulated volume sold in 2001 was 22.0 MMBF, 21 percent of the 107 MMBF average annual ASQ. Table 3-10B displays the sell target and volumes offered and sold in fiscal years 2000 and 2001. Only sawtimber size material harvested from timber-suitable management areas is counted towards the ASQ and the "regulated" timber program. "Unregulated" volume is material smaller than sawtimber. Examples include: firewood; certain cull, dead or non-commercial species or products; and all timber harvested from areas that are not in the commercial timber (suitable) base. This would include fire-killed timber salvaged from a timber-unsuitable management area or timber cut to improve wildlife habitat in a timber- unsuitable management area. Unregulated volume is not "charged" to the ASQ.

Table 3-10B. Timber Sale Program for Fiscal Years 2000 and 2001.

	Fiscal Year 2000	Fiscal Year 2001
Sell Target	27.0 MMBF	34.0 MMBF
Offered	14.0 MMBF	24.0 MMBF
Sold	14.0 MMBF	24.0 MMBF

	Fiscal Year 2000	Fiscal Year 2001
Sold Chargeable to ASQ	12.0 MMBF	22.0 MMBF
Sold Non-chargeable	2.0 MMBF	2.0 MMBF

Monitoring Item 3-11: Harvest Unit Restocking

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Assure restocking within 5 years.

REPORTING PERIOD:

Annual

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

Development of regeneration backlog.

Introduction: This monitoring item has two specific areas of concern.

- (1) Are we assuring that harvested stands can be restocked within five years?
- (2) Is a regeneration backlog developing?

The first concern, assure restocking within five years, is defined in Forest Service Handbook 2409.26b-211 as "in accordance with Forest Service policy, Northern Region timber harvest and regeneration practices shall be designed to assure lands are satisfactorily restocked within five years after final harvest." Final harvest is further defined as clearcutting or final overstory removal of seed tree and shelterwood harvests. NFMA regulations (CFR 219.27 (c)(3)) require that regeneration harvest be implemented only when the technology and knowledge exists to adequately restock the lands within five years after final harvest.

The second concern is the number of acres in failed regeneration status over the years. This information can indicate whether a trend in failed regeneration acres is developing. Care must be exercised in looking at the numbers on an annual basis, however.

Methods: Regeneration activities are to be reported either as certified, progressing, or failed. Stands are adequately or satisfactorily stocked when they meet certified or progressing criteria. Certified stands meet all of the following Regional criteria: 90 percent of the stand area is within the following standards: regeneration has survived for three growing seasons for natural regeneration or two growing seasons for plantings, and the regeneration is healthy and is a minimum height of six inches. District Silviculturists certify stands. Progressing stands should meet certification criteria within the specified time period without further major treatments. Failed stands do not meet certification requirements and may require major treatments such as site preparation or artificial regeneration.

Specific on-site monitoring of all regeneration harvest areas occurs at the end of the first, third and fifth summer growing seasons or until the stand is certified as adequately stocked. These monitoring results are recorded in a computerized database, the Timber Stand Management Record System (TSMRS). Northern Region policy requires that all regeneration harvest stands cut since 1976 are reported by District personnel in TSMRS.

Queries of the stocking data from TSMRS are assessed by the Forest Silviculturist to determine if stands are being restocked within five years after final harvest and if failed acres are increasing.

Results: Northern Region report from TSMRS, Regeneration Status of Final Harvest Stands since 1976 summarizes the status of harvested stands five years after harvest. Table 3-11A includes stand acres harvested from 1976 to 1996. The information may be incomplete prior to 1976. Stands harvested after 1996 are not within the five-years-after-harvest time frame.

Table 3-11A displays the regeneration status for final removal harvests: clearcutting, seed tree, and shelterwood. Results show 98 percent or 29,160 acres are certified or progressing satisfactorily and 87 percent or 25,887 acres have been restocked within five years after harvest.

Table 3-11A. Regeneration Status 5 Years or More After Final Harvest

Year	Total	Satisfactorily Stocked Within Five Years		Progressing Or Certified Now		Failed Or No Status ¹	
	Acres	Acres	%	Acres	%	Acres	%
1976	990	786	79	990	100	0	0
1977	687	438	64	684	100	0	0
1978	317	213	67	317	100	0	0
1979	898	690	77	898	100	0	0
1980	1079	751	70	1026	95	53	5
1981	1574	1237	79	1574	100	0	0
1982	745	639	86	737	99	8	1
1983	1012	757	75	955	94	57	6
1984	1510	1394	92	1510	100	0	0
1985	1407	1322	94	1352	96	55	4
1986	1656	1525	92	1652	100	4	<1
1987	2468	2214	90	2468	100	0	0
1988	2149	2041	95	2126	99	23	1
1989	4234	4052	96	4234	100	0	0
1990	3217	2862	89	3217	100	0	0
1991	1025	862	84	998	97	27	3
1992	1828	1612	88	1753	96	75	4
1993	1383	1204	87	1315	82	68	5
1994	927	771	83	823	89	104	11
1995	271	257	95	271	100	0	0
1996	299	260	87	260	87	39	13
TOTAL	29,676	25,887	87	29,160	98	513	2

Clearcut and Final Removal Harvests only, from 1976-1994.

Timber Suitable Areas only.

TSMRS report, Timeframe, as of April 2002

¹ **No status** means that although a regeneration activity has been accomplished no regeneration survey is coded in the TSMRS database. The majority of stands with no status is recently regenerated, but has not been through the required growing season before survey. Site preparation by burning has not been completed on the other acres. In many instances, site preparation by burning is delayed due to the required weather and fuel moisture conditions necessary to accomplish a safe and efficient burn.

Evaluation: The trend of adequate stocking within five years is positive. Until 1976, only 52 percent of the acres were reported as adequately stocked within five years. Twenty-

seven years later, 98 percent of the final harvest acres, from 1976-1996, are currently reported as adequately stocked (Table 3-11A). Several reasons contribute to this, including but not limited to, improved record keeping and improved application of silviculture treatments.

A regeneration backlog is not developing. The total number of failed acres from all regeneration harvests continues to be lower than the 1,760 acres reported in 1987. Currently, no acres are listed as regeneration failures for units harvested prior to 1996.

For stands harvested from 1976 through 1999, the average time from planting, seeding or final harvest to satisfactory stocking is less than four years. Refer to Table 3-11B.

Table 3-11B. Average regeneration time frames.

Regeneration Type	Average Time to Satisfactory Stocking
Plantations ¹	3.68 years
Natural Regeneration ²	3.62 years

¹Northern Region reforestation indices report #22, projected as of April 2002, for the Lolo National Forest stands planted between 1976 and 2001.

²Northern Region reforestation indices report #24, projected as of April 2002, for Lolo National Forest stands naturally regenerated between 1976 and 2001.

Forest monitoring indicates that overall, sites being harvested can be assured of restocking within five years given the current technology and knowledge that exists.

Reforestation success on the Lolo National Forest is high. Some failures have occurred due to environmental conditions such as drought, animal foraging, diseases, insects, and to inappropriate application of silviculture practices on some sites. Future regeneration efforts will have some failures mainly due to environmental conditions. Given the current levels of planning, budgeting and implementation, a backlog of areas lacking reforestation should not develop.

Recommendation: Continue the current monitoring effort. Forest Silviculturist should request to review the Ranger Districts confirming the status of 513 acres having "no status" in the database. A report due September 30, 2002 should indicate the status and treatments needed for all of these acres.

Monitoring Item 3-12: Silvicultural Treatment Projections

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure silvicultural treatments (harvest, thinning, etc.) are planned and accomplished as projected in Forest Plan.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Development from 10-year output schedule.

Methods: All silvicultural activities are reported within the Timber Stand Management Record System (TSMRS). The Forest Silviculturist queries this database to determine the actual number of acres treated by activity type and management area (MA). Activities included in this report are clearcuts, seed tree, shelterwood, selection, commercial thin, and timber stand improvement.

Results: The following tables result from the TSMRS data queries. Table 3-12A is a comparison of Forest Plan projected activity acres compared to actual accomplished acres. Tables 3-12B, C, D, E, and F are comparisons of Forest Plan projected acres to actual acres accomplished by MAs for specific activities.

Table 3-12A. Outputs - Actual vs. Projected Silvicultural Activities, 1987-2001.

Activity	Forest Plan Projected Annual Average (acres)	Actual Annual Average to Date (acres)	Percent of Projected
Silvicultural Exams	62,000	42,000	68%
Clearcut Harvested	NA	941	NA
Seed Tree Harvested	NA	930	NA
CC & ST Harvested	3,700	1,876	51%
Shelterwood Harvested	10,320	726	7%
Overstory Removal Harvested	NA	319	NA
Selection Harvested	1,670	215	13%
Sanitation/Salvage Harvested	NA	887	NA
Commercial Thinning	200	434	198%
Timber Stand Improvement (appropriated)	773	861	111%

Table 3-12B. Clearcut Acres (Includes Seed Tree Acres)

Management Areas	Average Annual Projected Decade 1 (acres)	Accomplished Fiscal Years 2000/2001 (acres)	Average Annual Accomplished Fiscal Years 1987-2001 (acres)
1	0	0	2
2	0	0	3
6	0	0	1
7	0	0	0
9	0	0	1
13	0	0	1
14	0	0	12
15	0	0	1
16	2,012	169/136	1,436
17	526	0	36
18	123	0/96	65
19	0	0	7
20	86	0/7	54
20a	0	0	3
21	0	0/7	22
22	0	0	16
23	0	0	15
24	0	4/39	35
25	953	19/63	125
26	0	0	31
27	0	0	12
Clearcut only	N/A	32/75	941
Seed tree only	N/A	160/273	930
TOTAL	3,700	192/348	1,871

Table 3-12C. Shelterwood Acres

Management Areas	Average Annual Projected Decade 1 (acres)	Accomplished Fiscal Years 2000/2001 (acres)	Average Annual Accomplished Fiscal Years 1987-2001 (acres)
16	6,405	338/203	401
17	565	260/0	80
18	161	0/74	108
19	0	131/0	15
20	444	0	3
20a	0	0	3
21	0	0	6
22	0	0	13
23	201	47/0	19
24	0	97/0	34
25	2,544	44/30	52
26	0	0/18	8
27	0	0	8
TOTAL	10,320	917/325	726

Table 3-12D. Selection Acres

Management Areas	Average Annual Projected Decade 1 (acres)	Accomplished Fiscal Years 2000/2001 (acres)	Average Annual Accomplished Fiscal Years 1987-2001 (acres)
14	0	0	3
16	0	0	51
17	0	11/0	4
18	0	0	25
19	0	0	2
20	0	0	0
21	0	0	2
22	556	0	7
23	0	55/0	94
24	1,114	30/0	10
25	0	0/15	37
26	0	0	3
TOTAL	1,670	96/15	215

Table 3-12E. Commercial Thin Acres

Management Areas	Average Annual Projected Decade 1 (acres)	Accomplished Fiscal Years 2000/2001	Average Annual Accomplished Fiscal Years 1987-2001
9	0	5/0	0
16	200	610/238	266
17	0	116/0	19
18	0	0	25
21	0	0	4
22	0	0	7
23	0	0	31
24	0	67/0	16
25	0	251/55	69
26	0	0	1
27	0	0	7
TOTAL	200	1,049/293	434

Table 3-12F. Timber Stand Improvement Acres

Management Areas	Average Annual Projected Decade 1 (acres)		Accomplished Fiscal Years 2000/2001 (acres)		Average Annual Accomplished Fiscal Years 1987-2001 (acres)	
	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds
9	0	0	82/165	0	22	0
16	773	0	530/374	149/76	372	145
17	0	0	50/20	0	12	4
18	0	0	260/489	0/20	208	10
19	0	0	19/15	0	2	0
20	0	0	0	0	21	28

Management Areas	Average Annual Projected Decade 1 (acres)		Accomplished Fiscal Years 2000/2001 (acres)		Average Annual Accomplished Fiscal Years 1987-2001 (acres)	
	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds	Appropriated Funds	KV Funds
21	0	0	0/163	0	14	0
22	0	0	0	0	5	1
23	0	0	50/70	0	46	9
24	0	0	0/20	0	35	12
25	0	0	121/0	0	96	36
26	0	0	0	0	11	0
TOTAL	773	0	1112/1316	149/96	861	245

Evaluation: The total acres harvested by all silvicultural methods to date (fiscal years 1987 through 2001) are much less than projected in the Forest Plan. On an average annual basis, silvicultural treatments are below Forest Plan projections.

Clearcut and seed tree harvests continue to decline. Ten years ago, 1991, they were at 65 percent of projected Forest Plan output. Today, clearcutting and seed tree harvests are only 9 percent of projected Forest Plan output.

The Lolo National Forest has dramatically reduced the clearcut and seed tree acreages in timber sales that are currently under preparation. Also, clearcutting no longer removes all of the trees from a stand. We now leave many trees standing, individually or in groups, in "clearcuts," for structural diversity, wildlife habitat, and other resource objectives.

Monitoring Item 3-13: Even Aged Harvest

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Insure harvest by even-aged management is compatible with other resource values.

REPORTING PERIOD:

Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

Departure from management direction.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship

Results/Evaluation: The silvicultural prescriptions monitored by the Forest silviculturist have been compatible with other resource values and objectives.

Previous monitoring reports emphasized the need to better document the compatibility between even-aged management and other resource values. The Forest Silviculturist finds that nearly all recent even-aged management units proposed by ecosystem management assessments have been driven by a desire to replicate natural disturbance processes to maintain species diversity and ecological sustainability. Compatibility with other resources is assessed during the interdisciplinary team interaction and Line Officer decisions.

Monitoring Item 3-14: Insects and Disease

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure harvest will not promote disease and insect increases.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Increases in insect/disease problems following logging.

Methods: Annually, the Forest Silviculturist reviews a sample of the detailed silvicultural prescriptions for Forest Supervisor's authority proposed timber sales and for vegetation treatments visited during Forest Plan monitoring trips. No monitoring trip occurred in 2000 due to the abnormally long wildfire season. Silvicultural prescriptions reviewed during fiscal years 2000 and 2001 included the Canyon Face and Northside timber sales, Pattee Blue Ecosystem restoration and Clearwater Stewardship.

Results/Evaluation: There were no major departures from management direction.

Comments under Item 3-5 also apply to this monitoring item. In previous years, all departures from management direction, which would initiate further evaluation, were minor and related to residual tree treatment. In more recent years, silviculturists include better documentation on residual trees. This is a result from: 1) past monitoring reports, 2) New Perspectives emphasis, 3) a memo dated February 11, 1991, from the Forest Supervisor, 4) 2070/2470 Special Grove Management, Legacy Trees and Old Growth Ponderosa Pine Communities, and 5) 2070/1950 Old Growth Strategy memo dated April 29, 1994. Land managers, silviculturists and other resource specialists recognize the importance of insects and disease as a part of healthy ecosystems. Also see the Lolo National Forest Plan Five Year Review dated April 1993.

Monitoring Item 3-16: Timber Suitability Classification

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Review timber suitability of lands classified as unsuitable.
REPORTING PERIOD:	10 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Classification of lands as suitable.

Methods: Review of timber suitability is a function of Forest Plan revision. This review is to be conducted during the revision of the Forest Plan, beginning in fiscal year 2003.

Monitoring Item 3-EM: Ecosystem Management

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Are target landscapes identified?
	Are the target landscapes based on appropriate time frames and spatial scales to be consistent with our desired condition across the landscape?
	Are comparisons of these landscapes made relative to the existing vegetation patterns, species composition, structure, and natural processes?
	Does the project proposal move the landscape toward these desired target landscapes and processes?
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Introduction/Methods: The Lolo National Forest added this monitoring item in 1993 to incorporate ecosystem management into the Forest Plan. These questions are answered during the annual Forest Plan monitoring trips.

During the past nine years, the Lolo National Forest organized its broad-scale NFMA analysis by mapping areas of 15,000 to 60,000 acres called "ecosystem management areas (EMAs)" as units of analysis. Analysis at this scale is also known variously as

"integrated resource analysis," "ecosystem analysis at the watershed scale," and "EMA analysis".

Analysis consists of:

1. a review of the conditions in the area,
2. a comparison of the current state to conditions under "natural processes" (i.e., before European settlers altered ecological and biological processes),
3. analysis of social objectives, and
4. a list of "opportunities" that are considered desirable to move the area to a better ecological condition, to produce commodities and recreation, and to meet social objectives.

This list of "opportunities" serves as a basis for proposed projects in the analysis area. The context provided by the EMA analysis helps in prioritizing these potential actions. Implementation may be determined by availability of funding or personnel. Should conditions change, new opportunities may be added.

Evaluation: In general, projects that are currently being implemented were identified as needs and/or opportunities during the NFMA analysis. In fiscal year 2000, a Burned Area Assessment (BAA) was conducted in watersheds burned during the wildfires of 2000. The BAA characterized the assessment area, identified issues and key questions, described current conditions, described historic conditions, interpreted the results, and developed recommendations for each of the resources in the area. The BAA concluded that the fires of 2000 had both beneficial and adverse impacts on the physical, biological and human resources of the Lolo National Forest. This assessment formed the basis for initiating an environmental analysis of the areas that burned in 2000.

The Northside Timber Sale and the Canyon Face Timber Sale/West Fork Thompson EMA were reviewed during the fiscal year 2001 monitoring trips. Opportunities identified in the Northside EMA were to improve winter range and elk forage, encourage ponderosa pine growth, and to reduce fuels within stands, thereby helping to reduce the risk of catastrophic fires. Key issues and proposed management strategies identified in the West Fork Thompson EMA centered around access management, recreational opportunities, grizzly bear recovery, roadless lands, watershed stability, forest/ecosystem health, mineral extraction potential, and fisheries decline. No departures from management direction were noted during the field review. Both of these projects fulfilled many of the opportunities identified in the EMA analysis. For more information see Appendix C, 2001 Monitoring Trip Findings Summary.

Additionally, the Forest Plan monitoring group discussed the 1995 Lolo National Forest Ecosystem Management Process guidebook, "Process of Integrating Ecosystem Management and NEPA". As in previous years, Forest personnel recognize that ecosystem management continues to evolve. The group came to the conclusion this guidebook needs to be updated to make it consistent with regulations and policy pertaining to conducting watershed assessments, roads analysis, the National Fire Plan, the Lolo National Forest vision, the National Resource Agenda, and the Northern Region Overview.

Action Item: Collect employee comments on the Lolo National Forest guidebook, "Process of Integrating Ecosystem Management and NEPA". The Forest Leadership Team directed that this guidebook be updated to be consistent with new regulations and policy. Updates to the guidebook are scheduled to be completed in 2002.

Monitoring Item 4-1: Sediment and Water Yield Assumptions

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Validation of sediment and water yield assumptions used in the Forest Plan.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	30 percent variability from sediment yields used in the model.

Introduction: The objective of this monitoring item is to determine whether the sediment and water yield coefficients used in the Forest Plan reflect current values. The sediment and water yield assumptions in the Lolo National Forest Plan are based on numerical coefficients representing average annual values of precipitation, evapotranspiration, runoff, runoff timing, erosion, sediment delivery efficiency, and channel stability. These coefficients were derived from a number of sources; long-term records compiled by the National Weather Service, US Geological Survey, Soil Conservation Service, documented research and scientific studies performed by universities and Federal and state agencies, and Forest watershed inventory and monitoring data.

Evaluation: Based on over a decade of monitoring data, there is a discrepancy of more than 30 percent between the baseline sediment and water yield values projected by the Forest Plan and actual measured data.

Recommendation: Steps should be taken to develop appropriate local coefficients for sediment and water yield for the next Forest Plan revision. Annual monitoring data are in the Forest watershed database. These data will be used as the basis for any watershed coefficients needed in the upcoming Forest Plan revision. This monitoring item has served its purpose; further reporting was discontinued in 1998.

Monitoring Item 4-2: Water Quality Statutes Compliance

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor for compliance with existing State and Federal water quality statutes.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Activities not meeting State and Federal water quality standards or leading to long-term degradation of aquatic environment.

TEMPERATURE MONITORING

Introduction: The analysis and methods supporting this item tier from previous years analyses and follow the framework within the current year Forest water monitoring plan.

The Lolo National Forest Plan, as amended by the Inland Native Fish Strategy (INFISH) in August, 1995, includes Riparian Management Objectives for stream temperature:

“Maximum water temperatures below 59°F (15°C) within adult holding habitat and below 48°F (9°C) within spawning and rearing habitat.” (Measured as the average of the maximum daily temperature of the warmest 7-day period)

In the past, a general perception among aquatic scientists in the northern Rocky Mountains was that stream temperature was seldom a limiting factor for aquatic life in forested environments. Recently though, stream temperature has been elevated as a concern particularly as it affects bull trout (*Salvelinus confluentus*). Bull trout appear to be especially sensitive to water temperature. Research reviewing temperature requirements of bull trout is summarized by Reiman and McIntyre (1993):

“Temperatures in excess of about 15°C are thought to limit distributions.”

“Optimum temperatures for rearing were about 7-8°C.”

“Optimum temperatures for incubation have been estimated to be in the range of 2° to 4°C.”

Reiman and McIntyre suggest that even temporary shifts in temperature regimes have severe impacts on bull trout populations.

Methods: Temperature measurements have been made as a regular part of the Lolo National Forest water monitoring program for the last 20 years. Available temperature data consists of regular and random thermometer readings and occasional mechanical thermograph recordings. Data, for the most part, are weekly (or less frequent) readings. Most of these readings were collected during the rapid snow melt runoff portion of the hydrograph supplementing suspended sediment and stream flow measurements, the primary focus of the water monitoring program. Readings were generally discontinued in mid-summer as the peak of the hydrograph subsided. The few instances when data were

collected throughout the season suggest that stream temperatures across the Forest reach their peak during the month of August and then drop quickly during September.

In 1999, Stowaway Temperature Data Recorders were placed in the following streams:

- Tamarack Creek - 4 sites
- Henry Creek – 1 site
- Cottonwood Creek - 1 site
- North Fork Cottonwood Creek - 1 site
- Howard Creek – 3 sites
- Tepee Creek (Howard Creek tributary.) – 1 site

Twenty-seven sites located on tributaries of 4 major river basins within the Lolo National Forest, were established for temperature recording during the spring, summer, and fall of 2001. Temperature recorders logged information from each site every ½ to 1 hour, 24 hours a day from about June 27 to October 28. The information retrieved was analyzed using the Montana Department of Environmental Quality Temperature Macro for daily maximum and minimum temperatures, as well as for 7-day maximum temperatures.

Results: In almost all streams where historic (pre-1999) data were available, summer stream temperatures exceeded the range reported as optimum for bull trout rearing. Mormon Creek, a north aspect tributary to Lolo Creek fed by late melting snow packs of Lolo Peak, was the only monitored drainage where stream temperatures were within or below the optimum temperature range on any regular basis.

During August and September 1995, intensive monitoring of two undeveloped watersheds (Rattlesnake Creek and South Fork Lolo Creek) investigated natural ranges of stream temperature in relation to elevation, aspect and natural riparian condition. Also in 1995, an electronic temperature probe was connected to the U.S. Geological Survey telemetry station at the mouth of Rock Creek, an important bull trout fishery and Priority Watershed for protection and recovery of the species. These initial data indicate stream temperatures may widely exceed optimums for bull trout rearing from at least early August through mid-September.

Howard Creek, a tributary of Lolo Creek, had the warmest temperatures recorded in 1999. In Howard Creek Meadows, upstream from the confluence with Tepee Creek, daily maximum water temperature was 20°C for nine days between mid-July and mid-August. Tepee Creek contributed water that had a maximum daily temperature between 15°C and 17°C for the period of mid-July through the end of August. The lack of riparian vegetation in the meadows where the upper Howard and Tepee Creeks' recorders were located contributed to these warm temperatures. At the mouth of Howard Creek, five miles downstream, the forest canopy shade allowed the stream to cool such that the maximum daily temperature was between 13°C and 14°C throughout the monitoring period.

Cottonwood Creek, a tributary to the Blackfoot River, had the coolest water recorded during the summer of 1999. The highest daily maximum temperature was 11°C for several days near the end of July.

For the other stations monitored, daily maximum water temperatures were between 15°C and 17°C for several days during the first half of August.

Temperature information recorded during 2001 is displayed in Table 4-2A below. Seasonal maximum temperatures ranged from 9.3°C, South Fork of Little Joe Creek, to 28.1°C, Rock Creek (unshaded). While the minimum temperature for the rivers and

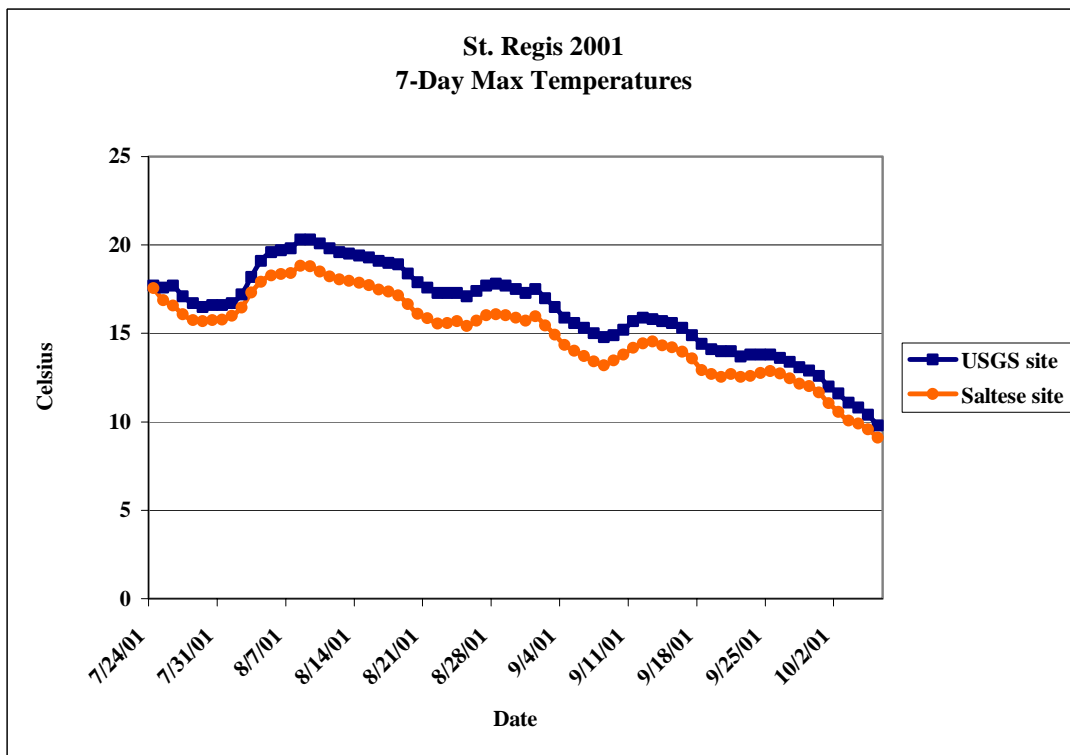
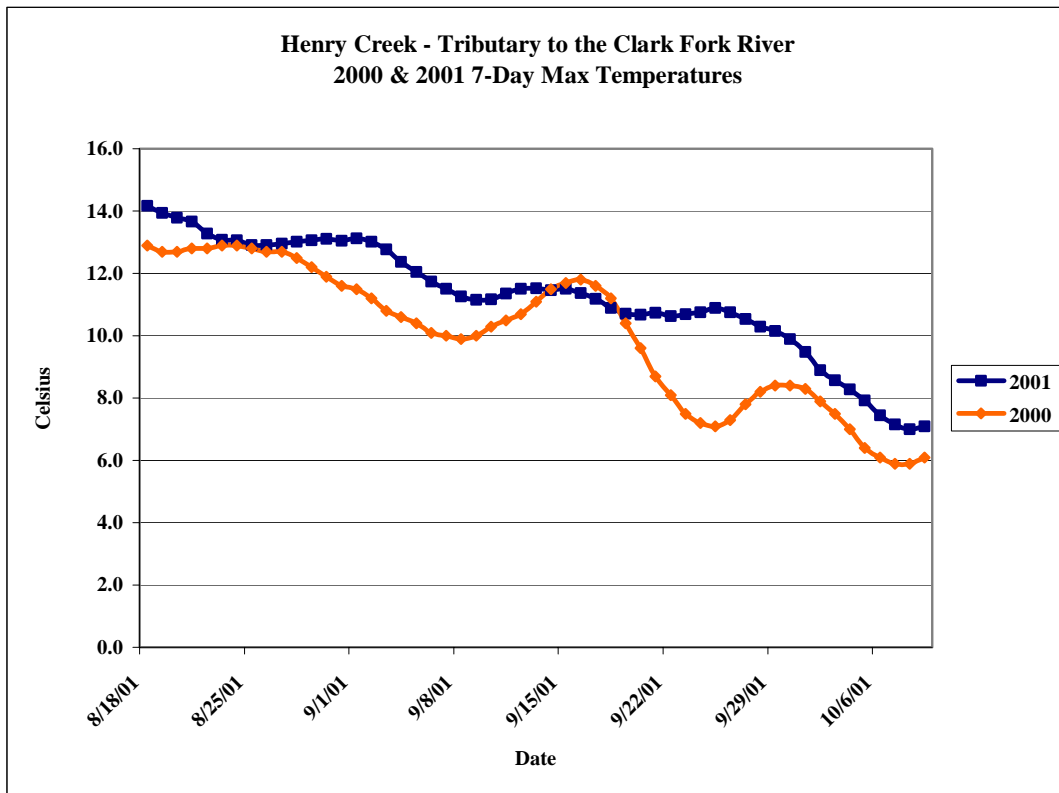
tributaries ranged from 0°C, East Fork of Lolo Creek and Rock Creek (unshaded) to 8.6°C, Silver Creek (below lake).

Table 4-2A. Temperature recorder location and maximum/minimum temperatures, 2001

Temperature Recorder Location	Tributary	Max Temp C°	Min Temp C°	7-Day Max Temp C°
Henry Creek	Clark Fork River	15.2	4.4	15.6
Lolo Creek	Bitterroot River	19.5	5.4	18.4
East Fork of Lolo Creek	Lolo Creek	18.4	0.0	17.5
West Fork of Lolo Creek	Lolo Creek	20.7	0.6	19.4
Lee Creek	Lolo Creek	13.8	0.7	13.1
Ninemile Creek	Clark Fork River	22.7	8.1	22.0
Beecher Creek	Ninemile Creek	11.1	5.5	10.9
Camp Creek	Ninemile Creek	17.6	3.4	16.9
St. Louis Creek	Ninemile Creek	12.2	1.9	12.0
Soldier Creek	Ninemile Creek	13.3	4.0	12.7
Rock Creek (shade)	Clark Fork River	23.7	3.3	22.2
Rock Creek (unshaded)	Clark Fork River	28.1	0.0	26.7
Alder Creek	Rock Creek	11.4	3.0	11.0
St. Regis River	Clark Fork River	19.6	3.3	18.8
St. Regis USGS gaging site	Clark Fork River	21.0	5.4	20.3
Savenac Creek	St. Regis River	19.6	2.8	19.0
Little Joe - mouth	St. Regis River	12.1	5.6	11.9
Little Joe - trail	St. Regis River	13.7	4.0	13.3
South Fork of Little Joe Creek	St. Regis River	9.3	6.3	9.0
Silver Creek	St. Regis River	17.3	2.0	16.7
Silver Creek - below lake	St. Regis River	22.5	8.6	21.8
Sunday Creek – at mouth	St. Regis River	14.8	2.8	14.3
Big Creek	St. Regis River	19.1	2.6	18.6
Deer Creek – at mouth	St. Regis River	14.4	5.7	14.1
12 Mile Creek - mouth	St. Regis River	17.9	5.3	17.5
12 Mile Creek	St. Regis River	19.5	1.8	18.9
Rock Creek – at mouth	St. Regis River	20.0	2.9	19.0
Ward Creek – at mouth	St. Regis River	12.8	3.9	12.5
Flat Rock	12 Mile Creek	16.0	2.1	15.4
West Fork of Thompson River	Thompson River	11.1	6.4	10.8
Four Lakes	W. Fk Thompson River	13.8	5.2	13.1

During 2001, average 7-day maximum temperature at 17 of the 27 sites exceeded the 15°C threshold described by Reiman and McIntyre as limiting bull trout distributions.

The two following graphs illustrate how temperature may vary both from point-to-point on a stream in one year and also how temperature varies from year-to-year at the same monitoring location.



Evaluation: While bull trout incubation occurs during the cold months between October and March, the rearing stage lasts from one to three years (B. Riggers, pers. comm.). Existing temperature data indicates that most streams across the Forest are warmer than 8°C for several months during the summer; it is also not uncommon for streams to be warmer than 15°C for sustained periods. Water temperatures thus are frequently outside the INFISH Riparian Management Objectives.

Recommendations: More information on stream temperature as related to local weather, and watershed characteristics such as aspect, elevation and riparian condition is needed to determine if and where these objectives are achievable on the Lolo National Forest.

Reference: Reiman, B.E. and J.D. McIntyre. 1993. Demographic and Habitat Requirements for Conservation of Bull Trout. USDA Forest Service Intermountain Research Station. General Technical Report INT-302. 38 pp.

POST-FIRE TEMPERATURE MONITORING

Methods: Temperature data recorders were placed in Ninemile Creek and several tributaries (Camp, Soldier, West Fork Beecher, and St. Louis) during summer 2001 to record post-burn water temperatures from the fires of 2000. With a lack of pre-fire data a “paired watershed” approach was used to see if temperatures were elevated in two burned drainages. Data recorders were placed in Camp Creek and West Fork Beecher Creek to compare water temperatures in a severely burned drainage (Camp) and in a drainage that experienced little burning (West Fork Beecher). Both streams drain to the southwest and are of similar stream types making for a reasonable comparison.

Results: Temperatures in Soldier and Camp Creeks were virtually identical for the time that Soldier Creek was monitored, so it appears that the data gathered for Camp Creek would apply to Soldier Creek. Maximum and mean daily temperatures were higher in Camp than in Beecher Creek from late July through September. Minimum daily temperatures were higher in Camp Creek through most of September.

Summer water temperatures in Ninemile Creek were higher than temperatures in all of the other streams measured. Summer maximum temperatures were often above 20°C, with mean daily temperatures ranging from 16°C to over 18°C during summer. Daily summer temperature ranges of over 5°C were also higher than in the other streams. Autumn minimum temperatures were similar to those in the other streams, generally ranging from 8°C to 11°C.

Evaluation: Initial data indicate that the burned watersheds may be more sensitive to changes in air temperature than the unburned watersheds and less able to maintain stable temperatures when air temperatures are either very high or very low. The extent of this effect also depends on the amount of flow in a stream. More water provides for better temperature buffering. The estimated summer flows in Camp and Soldier Creeks were lower than in Beecher Creek. Burned watersheds appear to be less able to “buffer” the impacts of vegetation removal on stream temperature than unburned watersheds.

The elevated summer temperatures in Ninemile Creek may be due to a number of reasons. Temperatures were measured in the lower reaches of the stream, where the channel is broad and shallow, allowing the water surface to be more exposed to solar heating than in upstream, confined, reaches. This lack of topographic and vegetative shading, as well as low water conditions in 2001 would lead to enhanced water heating.

Information from Montana Department of Environmental Quality (Yashan pers. comm. October 2001), indicates that water temperature increases resulting from fire are considered a natural impact. Short-term variations from State standards in temperature are to be expected after disturbances such as landscape-scale fires. Post-fire temperatures may be considered a new baseline from which to assess the impacts of any further management activities or future fires.

BMP EFFECTIVENESS MONITORING

Introduction: Water quality and soil productivity standards are maintained on the Lolo National Forest by applying Best Management Practices (BMPs). The Best Management Practices Effectiveness Monitoring Report, published in March 2002, displays the results of the monitoring of specific sites where BMPs were applied and found to be effective. The management activities monitored include watershed management, vegetation manipulation, timber harvest, road and trail construction, fire suppression and fuels management. BMPs are selected on a site-specific basis, depending on physical conditions, economics, and social and technical feasibility.

“The application of best management practices will assure that water quality is maintained at a level that is adequate for the protection and use of the National Forest and that meets or exceeds Federal and State standards,” states the Lolo National Forest Plan in Standard No. 15. BMPs are selected during the initial stages of project planning. Timber sale administrators, engineers, resource specialists, or other qualified personnel, implement BMPs during the course of a project.

Methods: The intent of this study was to review and evaluate several examples from a full range of BMPs as described in the publications *Water Quality BMPs for Montana Forests* (Logan 2001), and the *Soil and Water Conservation Practices Handbook, FSH 2509.22* (USDA 1988). Each BMP example was evaluated, to assure that the practice had been implemented as intended. In addition each BMP was described in terms of effectiveness in protecting water quality.

The study focused entirely on whether the Best Management Practices performed as they were intended.

Results: The Best Management Practices Effectiveness Monitoring Report is the concluding report of an effectiveness-monitoring program started on the Lolo National Forest in June 2000. The entire report is available on the Lolo National Forest website at www.fs.fed.us/r1/lolo/soil-water/best-mgt-practices.html. Annual monitoring of the Best Management Practices will ensure continued effectiveness.

Monitoring Item 4-3: Soil Productivity

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor the effect of soil disturbance/displacement on land productivity.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Movement or compaction of soils reducing productivity more than 20 percent.

Introduction: The objective of this monitoring item is to determine whether changes in soil bulk density and organic matter or amount of soil movement reduces basic soil productivity more than 20 percent.

Methods: Several procedures are used to monitor soil productivity. Range allotments are monitored annually to assess the amount of soil compaction in sensitive areas caused by grazing. Compaction on roads and skid trails is assessed during annual Forest Plan monitoring field reviews of timber sales. The potential for organic matter and nutrient recycling is assessed on these sites from the amount of woody debris left on site after timber harvest activities. The amount of soil movement is inferred by evaluating the potential for tractor harvest to cause soil displacement on units where slopes are greater than 35 percent. These units are individually reviewed for approval to assure meeting soil productivity standards.

Results: During 2000 and 2001, the Lolo National Forest had 13 active timber sales with contract requirements for coarse woody debris retention. Of the 13 timber sales, 111 units had coarse woody debris left on site. Out of the 111 units with coarse woody debris 71 units were assessed for adequacy of coarse woody debris. All of the units assessed were found, by general observation, to have had sufficient amounts of coarse woody debris remaining on site after harvest. In addition, 43 units met the Forest's scarification guidelines.

Table 4-3A. Timber Sale Units Assessed for Coarse Woody Debris Retention in 2000 and 2001.

Timber Sale	District	Number of Units	Number of Units Requiring Woody Debris	Number of Units assessed for Woody Debris	Number of Units w/ sufficient Woody Debris
Northside	Missoula	24	24	8	8
Lolo Cloudburst	Missoula	83	40	16	16
Marshall Ski 2	Missoula	5	0	0	0
Arch Loop	Seeley Lake	7	7	7	7
Chain of Lakes	Seeley Lake	13	0	0	0
Arch Inez	Seeley Lake	4	3	3	3
Dry Camp	Plains	3	3	3	3
Raven	Plains	5	5	5	5

Timber Sale	District	Number of Units	Number of Units Requiring Woody Debris	Number of Units assessed for Woody Debris	Number of Units w/ sufficient Woody Debris
Boyer	Plains	10	10	10	10
Hard Knox	Plains	12	12	12	12
Fitness	Plains	2	2	2	2
Mosquito	Plains	1	1	1	1
Wee Teepee	Plains	2	2	2	2
Chipmunk	Plains	2	2	2	2

Evaluation: In 2000 and 2001, retention of coarse woody debris in harvest units was found to be sufficient in all of the harvest units requiring such retention.

The coarse woody debris retention requirement arose when many silvicultural prescriptions combined clearcutting and tractor piling site preparation. Prescriptions have evolved away from clearcutting and tractor piling to partial cutting followed by underburning. Currently, many treated stands contain trees of small diameter and the coarse woody material retained is of smaller diameter (4.5 to 5.5 inches) than was envisioned when this monitoring item was developed. Small diameter material is often fully or partially consumed in slash treatment following harvest.

Previous Forest Plan Monitoring and Evaluation Reports recommended that silviculturists, wildlife biologists, and soil scientists review the intents and approaches used to insure sufficient coarse woody debris retention following timber harvest and suggest modifications or improvements. To address this recommendation, an updated version of "The Woody Debris Resource on the Lolo National Forest" was released as a review draft in June 2002.

Recommendation: Certain management practices have problems meeting soil productivity standards. Soil compaction from livestock grazing in riparian areas continues to be one of these practices although notable improvements have been made in the last several years. Range allotments will continue to be monitored and management practices improved so that all range allotments meet Forest Plan standards.

Monitoring Item 5-1: Off-Road Vehicles

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Limit off-road vehicle damage.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	When off-road vehicle use conflicts with management goals of the area.

Introduction: The objective of this monitoring item is to analyze the use of off-road vehicles (ORVs) on the Lolo National Forest. The Forest Travel Plan prohibits motorized vehicle travel off of open roads or trails. Snowmobile use is generally considered open unless specifically restricted on an area-by-area basis. At this time, motorized use is restricted only on lands designated to wilderness (MA 12) and large blocks of roadless lands (MA 11). This restriction applies to snowmobile use.

Methods: ORV use is measured by the amount of resource damage and/or the number of new motorized trails that develop off of open roads and trails on the Forest. These unauthorized trails leave obvious marks on the landscape. No actual field counts have been conducted.

Results: District Resource Assistants observed a general increase in resource damage and trail tracks created by ORVs in fiscal year 2001. These observations indicate an increase in the number of ORVs using the Lolo National Forest.

Evaluation:

Missoula Ranger District

The largest area of unauthorized ORV use on the Missoula Ranger District occurs in the Deep Creek area, which extends from Deep Creek south to Telephone Butte, Black Mountain, and the Wildhorse Point areas. Unauthorized ORV use accesses National Forest system lands through Plum Creek Timber Company lands at lower elevations in the Deep Creek drainage. These access points through private land are difficult to patrol. A new spring road closure of the Gold Creek Road, at the request of Plum Creek Timber Company to protect meadows on their land, seems to have created ORV problems on the National Forest in Lolo Creek at Howard Creek Meadows.

Off-road vehicle violations in the Blue Mountain Recreation Area, where motorized and non-motorized trails are in close proximity, continue to occur. Additionally, the Moccasin Ridge area west of Swartz Creek continues to be a popular area for local ORV use. New unauthorized trails were created in this area in fiscal year 2001.

Unauthorized snowmobile use in the Rattlesnake Wilderness and the proposed Great Burn wilderness is unknown for fiscal year 2001. Bad weather combined with lack of funding limited monitoring from aircraft.

Plains/Thompson Falls Ranger District

ORV use is generally light but continues to grow at a low level across the Plains/Thompson Falls Ranger District. There are a few areas that show evidence of improper or illegal use in the form of resource damage or complaints from other users. Gated road violations and vandalism associated with travel restriction tend to be the largest portion of unauthorized use. This use primarily occurs during spring and fall hunting seasons.

Unauthorized snowmobile use in MA 11 is limited but did occur occasionally.

Seeley Lake Ranger District

No new unauthorized ORV trails were discovered on the Seeley Ranger District in fiscal year 2001.

Snowmobile use is heavy on the Seeley Lake Ranger District. Monitoring from the air had determined that some unauthorized snowmobile use in MA 11 areas occurred in fiscal year 2001. Most unauthorized use in MA 11 land occurs in the Lake Elsin and Pyramid Pass areas. Law enforcement patrolled these areas, but working with the local snowmobile club has proven to be more effective.

Superior Ranger District

Historic and current ORV use is found in the Mill Creek, Fourmile, and Big Creek drainages. This use is mainly to circumvent road closures. It is also occurring in the St. Regis basin, Brimstone, and the Blacktail areas. This use is most prevalent during hunting season.

Isolated incidences of mud bogging occurred primarily in Lost Creek, Cold Creek, Nemote and wet seeps across the District. Areas discovered were rehabilitated.

Snowmobile use on the Superior Ranger District continues to be popular. Some unauthorized use occurs in the St. Regis basin and Hoodoo areas. Silver County, Idaho, continues to promote this area for recreation opportunities and a large number of visitors come from the Inland Empire area. Law enforcement needed for unauthorized snowmobile use was sporadic.

Recommendations:

- 1) Continue to monitor ORV use across the Forest on an annual basis and document ORV-caused resource damage and user conflicts.
- 2) Identify critical issues that must be addressed prior to the next Forest Travel Plan and Forest Plan Revision. New Travel Plan or interim orders may result from addressing these issues.
- 3) Develop a plan with Law Enforcement Officers to patrol MA 11 areas for unauthorized use.
- 4) Continue to work with local snowmobile groups on closure orders and invite them to be involved in Forest Plan Revision.

Monitoring Item 5-2: Recreation Opportunities

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Provide opportunities for a wide spectrum of recreation activities.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	plus or minus 25 percent of target projected in the Recreation Opportunity Inventory.

Introduction: The objective of this monitoring item is to analyze recreation use on the Lolo National Forest and compare this use with Forest Plan projected use.

Methods: Developed recreation use information was obtained through campground use numbers and collected fee use dollars. Observations by hosts at these developed recreation sites were also used. Use levels and patterns in dispersed recreation and wilderness areas were obtained through field observations by District field crews who monitored use along roads and trails and made personal contacts with Forest visitors. Wilderness management was monitored by evaluating number of acres managed for wilderness values on the Lolo National Forest.

Results: Western Montana continues to be a destination location for tourism and recreation with the greatest increase in use occurring in Developed Recreation. Refer to Table 5-2A.

Developed Recreation: Although visitor use was not monitored in 2000, it was substantially lower than previous years due to the extreme wildfire situation that summer. Comparatively, observed visitor use in 2001 appears to have been much higher. On average, developed recreation use differed between Ranger Districts in 2001. Seeley Lake and Missoula Ranger Districts found that developed site visitor use increased an average of 12 percent. However, Superior Ranger District reported a negligible 1 percent increase in developed recreation use in 2001. Overall, District personnel estimate that developed recreation sites on the Lolo National Forest received approximately 497,000 recreation visitor days (RVDs) in 2001.

Dispersed Recreation: Dispersed recreation use increased in 2001. District personnel calculated that General Forest Areas received 888,000 RVDs in 2001.

Wilderness Use: The Wilderness areas on the Lolo National Forest were closed during most of the summer of 2000 due to high fire danger. As a result, visitation to wilderness appeared to substantially increase in 2001 by a factor of 5 percent in the Welcome Creek (1785 Recreation Visitor Days or RVDs) and Rattlesnake Wildernesses (1628 RVDs) and 25 percent in the Scapegoat (5000 RVDs). The total number of RVDs for wilderness use on the Lolo National Forest in 2001 was 8413. No data or observations were recorded for 2000.

Wilderness Management: The Lolo National Forest currently manages 370,000 acres of wilderness-designated lands. No additional acreage was allocated to wilderness in 2001.

Trails Construction and Reconstruction: The Lolo National Forest manages 2,794 total miles of trails that serve hikers, horse users and off-highway vehicle users. In 2001, the Lolo National Forest constructed and/or reconstructed 12 miles of that trail base.

Table 5-2A. Recreation Use from 1987-2001 (figures are rounded to the nearest 1000)

Fiscal Year	Developed Recreation (M RVD*)	Dispersed Recreation (M RVD*)	Wilderness Use (M RVD*)	Wilderness Management (M Acres**)	Trails Constructed/Reconstructed (Miles)
1987	352	1080	12	369	0
1988	268	1300	9	369	22
1989	384	950	5	369	7
1990	331	1037	4	369	21
1991	360	1131	5	369	20
1992	378	1194	5	369	11
1993	315	1228	5	370	16
1994	329	1268	12	370	31
1995	375	1223	12	370	21
1996	376	1212	11	370	25
1997	410	781	10	370	22
1998	431	821	11	370	16
1999	444	846	9	370	34
2000	--	--	--	--	--
2001	497	888	8	370	12

* M RVD = Thousand Recreation Visitor Days

** M Acres = Thousand Acres

Evaluation: A slight increase in developed and dispersed recreation has been observed. Refer to Table 5-2B.

Developed Recreation: Developed recreation use is now 106 percent of the projected level in the Forest Plan.

Dispersed Recreation: Dispersed recreation has increased and is now 94 percent of the projected level in the Forest Plan.

Wilderness Use: Wilderness use is 47 percent of projected Forest Plan use levels.

Wilderness Management: Wilderness management continues to be 102 percent of Forest Plan projected outputs because no additional acreage was added to the wilderness base.

Trails Constructed and Reconstructed: The Lolo National Forest averaged 69 percent of the trail construction/reconstruction that was projected in the Forest Plan.

Table 5-2B. Forest Plan Projected vs. Actual Average Outputs for Recreation, 1987-2001

Activity	Unit	Forest Plan Projected (annual average)	Actual Average to Date	Percent of Projected
Developed Recreation	M RVD*	353	375	106%
Dispersed Recreation	M RVD*	1137	1069	94%

Activity	Unit	Forest Plan Projected (annual average)	Actual Average to Date	Percent of Projected
Wilderness Use	M RVD*	17	8	47%
Wilderness Management	M Acres**	363	370	102%
Trail Construction /Reconstruction	Miles	26	18	69%

* M RVD =Thousand Recreation Visitor Days

** M Acres = Thousand Acres

Recommendations:

1) Continue to direct appropriated, Capital Investment Program (CIP), and Fee Demonstration funding to: a) perform heavy maintenance and repair of recreation facilities (deferred maintenance); b) correct resource damage and poor health and safety conditions of facilities; c) improve universal accessibility of our recreation sites; and d) operate and maintain interpretive sites, congressionally designated areas, Scenic Byways, and Wild and Scenic Rivers corridors.

2) Hold new programs and facilities to a minimum.

3) Continue implementation of the Lolo National Forest Accessibility Transition Plan for developed recreation sites.

4) Continue to assemble, update, and validate Meaningful Measures data for all recreation uses on the Lolo National Forest.

5) Continue to monitor the effects and benefits of the Fee Demonstration project established for Developed Recreation fee sites.

Action Items completed in 2001:

1) Fee Demonstration projects, established for the developed recreation sites across the Lolo National Forest, seem to be working very well. Districts are able to keep generated funds and use them to maintain site facilities and features in need of repair/replacement, or to offer additional programs at the site. For example, Seeley Lake Ranger District has been using Fee Demo monies to replace tabletops, increase accessibility, and provide an interpreter for summer programs.

2) Meaningful Measures spreadsheets are an accounting process used to determine actual costs of maintaining sites. In 2001, data on the Meaningful Measures spreadsheets was validated and a leveling session was held to compare and level data calculations and assumptions across the Ranger Districts.

Monitoring Item 5-3: Roadless Land Changes

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Compare changes in acres and distribution of roadless lands with Forest Plan projections.

REPORTING PERIOD:

5 years

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

Changes different from what was projected.

Introduction: This monitoring item is used to track the changes to roadless areas that have been designated by the Lolo National Forest Plan. In November 2000, the Forest Service Roadless Conservation Final Environmental Impact Statement outlined new regulations to protect inventoried roadless areas within the National Forest System. In the preferred alternative, road construction, reconstruction, and timber harvest would be prohibited in all inventoried roadless areas except where specific exceptions have been met. Interim Directive 1920-2001-1 was issued on December 14, 2001 reserves decision to approve a road management activity or timber harvest in Inventoried Roadless Areas to the Chief or the Regional Forester unless specific exceptions have been met.

Methods: District personnel report road development in designated roadless areas.

Results: No development has taken place in roadless areas on the Lolo National Forest in fiscal years 2000 and 2001.

Evaluation: The Lolo National Forest has developed roadless areas at a much slower pace than the Forest Plan projected. Some roadless acres were corrected after errors were found during landscape level analysis. Thirteen years into the Forest Plan, 43,445 acres (30 percent) of designated roadless lands have been developed compared to the 142,864 acres projected for development by the end of the first decade. No road development has taken place in allocated roadless areas in the last several years.

Table 5-3A. Roadless Land Status on the Lolo National Forest.

Area Code	Roadless Area Name	1983 Net Acres	Projected Decade 1 Development	Actual 1984-2001 Developed	Projected Decade 1 Roadless	Remaining Roadless Oct. 2001
L1LAQ	McGregor-Thompson	27,850	27,568	14,350	282	13,500
01141	Maple Peak	6,960	*	0	*	6,690
01142	Stevens Peak	600	*	0	*	600
01152	Wonderful Peak	1,600	*	0	*	1,600
01202	Petty Mountain	16,980	0	0	16,980	16,980
X1204	Rattlesnake	2,700	1,740	0	960	2,700
X1205	Reservation Divide	16,300	2,560	338	13,740	15,962
X1209	Baldy Mountain	6,680	0	90	6,680	6,590
X1220	Ward Eagle	8,570	960	0	7,610	8,570
01301	Hoodoo	98,500	5,800	0	92,700	98,500
01302	Meadow Cr.-Upper	7,200	1,400	850	5,800	6,350

Area Code	Roadless Area Name	1983 Net Acres	Projected Decade 1 Development	Actual 1984-2001 Developed	Projected Decade 1 Roadless	Remaining Roadless Oct. 2001
	North					
01424	Silver King	12,840	1,920	1,338	10,920	11,502
01485	Bear-Marshall-Scapegoat-Swan	120,900	*	1,556	*	119,344
01665	Cataract	9,900	0	0	9,900	9,900
01781	Marshall Peak	9,400	0	629	9,400	8,771
01784	Cube Iron-Silcox	37,700	*	0	*	37,700
01785	Sundance Ridge	7,220	3,040	583	4,180	6,637
X1786	Teepee -Spring Cr.	14,890	480	2,761	14,410	12,129
01790	Mount Bushnell	43,070	20,000	1,902***	23,070	41,168
01791	Cherry Peak	39,640	4,160	690**	9	38,950
01792	Gilt Edge-Silver Cr.	11,200	*	2,005	*	9,195
01794	Pat's Knob-North Cutoff	17,200	7,200	50	10,000	17,150
01795	S.Siegel-S. Cutoff	14,800	7,360	818	7,440	13,982
01796	North Siegel	10,000	2,400	0	7,600	10,000
01798	Marble Point	13,170	5,280	2,438	7,930	10,732
01799	Sheep Mtn.-St. Line	40,500	7,200	3,391	33,300	37,109
01800	Stark Mtn.	14,140	6,560	587	7,580	13,553
01803	Burdette	16,360	480	0	15,880	16,360
01805	Lolo Creek	14,660	0	381	14,660	14,279
01806	Welcome Creek	1,100	0	0	1,100	1,100
01807	Quigg Peak	69,820	0	352	69,820	69,468
01808	Stony Mtn.	34,930	0	174	34,930	34,756
01809	Garden Point	6,500	6,500	4,216	0	2,284
01811	Evans Gulch	8,830	0	0	8,830	8,830
X1812	Clear Creek	5,470	5,470	1,681	0	3,789
01814	Deep Creek	7,970	4,101	2,265	3,869	5,705
	TOTAL	776,190	142,864	43,445	421,696	732,745

* Roadless areas continue onto adjacent National Forests. The acres recorded are only for the Lolo National Forest portion.

** 420 acres result from a boundary change to the roadless area. The discrepancy resulted from timber sales and power line development, which occurred prior to the Forest Plan. Appendix C of the EIS recognized these projects and the need to adjust the boundary after their completion.

*** Roads were built into this roadless area in 1997, but have been fully re-contoured and are no longer considered to be roads.

Monitoring Item 6-1: Livestock Forage Production

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Livestock forage available

REPORTING PERIOD:

Annual

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

Plus or minus 10 percent of projected target.

Introduction: The objective of this monitoring item is to evaluate if the Forest Plan projected outputs for livestock forage were available in grazing allotments across the Forest. This monitoring item primarily involves cattle grazing. Grazing by pack and saddle stock for recreational use and by the Forest for administrative use is not considered in this monitoring item.

Methods: Information concerning this item is summarized in the Forest range database. The database report summarizes livestock grazing authorized each year under permit for allotments across the Forest.

Results: A total of 2,251 animal unit months (AUMs)¹ of cattle grazing occurred on the Forest during the 2000 season. During the 2001 grazing season, a total of 2,423 AUMs of use occurred. There were an additional 470 AUMs of grazing capacity, which was in non-use status during 2000 and 121 AUMs of non-use for the 2001 season. Some allotments were not grazed at the request of the grazing permit holder for personal convenience or in order to facilitate allotment recovery as recommended by the Forest. This non-use represents grazing that could occur under the terms of an existing permit. This is considered "forage available" for the purpose of this monitoring report.

The total available grazing capacity for cattle on the Forest totaled 3,059 AUMs. This total is 21 percent of the Forest Plan projection of 14,300 AUMs. This is a variation from Forest Plan projections, which triggers the need for further evaluation.

Evaluation: The Forest Plan range forage output projections are based, in part, on areas no longer utilized for cattle grazing, such as closed allotments or vacant allotments where closure is pending. Projections were also based on uniform forage utilization throughout all lands within an allotment. This is not the case on steeper and forested slopes. Also, where grazing capacity was based on timber harvest units, many of these areas are now reforested to the point where forage is no longer available. Most cattle grazing on the Forest occurs on roadsides or is concentrated on narrow riparian areas or occasionally on flatter basins or ridges in proximity to water. Adjustments to individual allotment grazing capacities are being made through allotment analysis on a scheduled basis to reflect current conditions and actual usable forage availability.

Recommendations: During Forest Plan revision, the grazing potential of all allotments should be reevaluated. Projections of forage available on viable allotments should be

¹animal unit month (AUM) - an amount of grazing equal to what one cow and calf pair would consume in a one month period.

adjusted. Only forage on viable allotments should be included in Forest projections. Non-viable or long-term vacant allotments should be closed and their forage capacities removed from Forest projections. Forage projections should be updated to reflect forage capacity in areas of allotments, which are actually used by cattle.

Monitoring Item 6-2: Range Allotment Management Plans

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure range allotment management plans are compatible with Forest Plan direction.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Introduction: The objective of this monitoring item is to evaluate if individual range allotment management plans are compatible with Forest Plan direction. The Forest currently has an established schedule for updating grazing allotment analysis, planning and permit reissuance, which is displayed in the Forest range database.

Interdisciplinary teams, which include various resource specialists, analyze and develop plans for all projects including range-related activities. Specialist input is dependent upon the issues relevant to the specific project or allotment. Completed analyses, plans and proposed actions such as grazing permit reissuance are reviewed and recommended by the District Ranger before being approved by the Forest Supervisor. Reviews occur at all levels to insure compliance with Forest Plan direction as well as policy or legal requirements.

Methods: The Forest range database is reviewed for allotment project information concerning this monitoring item. Resource specialists monitor active allotments annually. Allotments are monitored for compliance with permit terms and conditions and resulting on-the-ground conditions, which reflect compliance with Forest Plan direction. Adjustments are made to grazing permit annual operating plans or grazing permits are amended as necessary to assure Forest Plan compliance.

Results: Tables 6-2A and 6-2B display the status of Forest allotments for fiscal years 2000 and 2001.

The grazing program on the Lolo National Forest is diminishing slowly over time due to a variety of reasons including: the economics of small scale ranching operations in the local area; the loss of private ranch lands adjacent to the Forest to subdivision and development; concerns over conflicting resource issues and values, including water quality and riparian values, threatened and endangered species and other wildlife habitat and weed management issues; and the loss of transitory range as past timber harvest units revegetate.

Table 6-2A. Fiscal Year 2000 Allotment Status

Number of Allotments	Status	Remarks
32		There are 32 allotments in the Lolo National Forest range database
8		Allotments pending closure for various reasons
21	Stocked	Allotments stocked with cattle during the grazing season
3	Non-use	No cattle were placed on allotment for various reasons
8		Current range allotment analyses
0		Analyses completed during 2000

Table 6-2B. Fiscal Year 2001 Allotment Status

Number of Allotments	Status	Remarks
32		There are 32 allotments in the Lolo National Forest range database.
8		Allotments pending closure for various reasons
21	Stocked	Allotments stocked with cattle during the grazing season
1	Non-use	No cattle were placed on allotments for various reasons
8		Current range allotment analyses
0		Analyses completed during 2001

Evaluation: In the past, the Forest has successfully updated permits and several allotment plans for consistency with Forest Plan direction. In fiscal years 2000 and 2001, no analysis or plans were completed due to limited resources as well as commitments to wildfire suppression efforts in 2000. However, annual field monitoring of active, stocked allotments with current analysis has shown that grazing across the Forest is in compliance with Forest Plan direction.

The completion of an allotment management plan and permit issuance, which is compatible with Forest Plan direction and current policy requirements, does not, in itself, guarantee that grazing will immediately meet standards on the ground. District resource specialists actively monitor allotments and administer permits to insure that grazing conforms to permit terms and conditions.

Recommendations: Allotment analysis should continue in accordance with the schedule in the Forest range database, to the extent funds are available. District resource specialists should continue annual field monitoring of stocked allotments to help insure that permit terms are being met and resulting field conditions meet Forest Plan direction.

Monitoring Item 6-3: Indirect Noxious Weed Control

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Compare projected to actual funding of indirect control (information, inventory and biological support).
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	15 percent of dollars projected in the Lolo National Forest's 1991 Noxious Weed Management Environmental Impact Statement (EIS)

Introduction: This item was added from Forest Plan Amendment 11. The objective of this monitoring item is to document funds spent annually on indirect weed control methods.

Methods: The Forest weed program leader monitors this item. Yearly funding and targets accomplished are compared to the projected funding and levels of activity stated in the Lolo National Forest's 1991 Noxious Weed Management EIS. The 1991 Noxious Weed Management EIS sets levels for indirect weed control activities such as information and education, prevention, inventory, and biological management.

Results: Table 6-3A displays a summary of fiscal years 2000 and 2001 accomplishments for each indirect weed control action, compared to the level of activity projected in the EIS. Funding information is also provided in this table.

Table 6-3A. Fiscal Years 2000 and 2001 Indirect Weed Control Accomplishments
(Actual vs. Projected in the 1991 Noxious Weed Management EIS).

Indirect Weed Control Action	Level of Activity Projected in the Noxious Weed Management Weed EIS	Fiscal Years 2000 and 2001 Actual Accomplishments
(Funding for Action)	(Funding projected)	(Dollars spent)
Information	Public awareness of weed problem and weed identification	<ul style="list-style-type: none"> • Posted weed free feed areas (2000 & 2001). • Weed awareness brochures at recreation sites (2000 & 2001). • Weed education booths at county fairs (2000 & 2001). • Continued <i>Leave No Weeds</i> education program (2000 & 2001). • Worked with City of Missoula on weed research and education programs (2000 & 2001). • Completed health risk assessment for herbicide use in partnership with other public and corporate land managers (completed in 2001). • Began and completed the Big Game Winter Range and Burned Area Weed Management EIS and Record of

Indirect Weed Control Action	Level of Activity Projected in the Noxious Weed Management Weed EIS	Fiscal Years 2000 and 2001 Actual Accomplishments
(Funding for Action)	(Funding projected)	(Dollars spent)
		Decision, which addressed weed management on 87,400 acres of big game winter range and areas that burned in the wildfires of 2000 (2001).
Funding	\$2,000	Not itemized, more than \$2,000 in fiscal year 2000 and over \$125,000 in 2001.
Prevention	Management requirements in Amendment #11	<ul style="list-style-type: none"> • Most management requirements in Amendment #11 were implemented on Forest projects (2000 & 2001). • Weed seed free feed required forest-wide (2000 & 2001). • Special Use Permit clause was developed and implemented on new and reissued permits for weed prevention and management (2000 & 2001). • Worked with Regional Task group and updated weed prevention BMPs and put them in a Regional Directive (2000).
Inventory	Systematic mapping of high-risk areas and comprehensive mapping of cooperative areas	<ul style="list-style-type: none"> • In calendar year 2001, inventoried over 7,000 acres that burned in the wildfires of 2000. • Inventoried weeds on proposed prescribed burns in Rock Creek on the Missoula Ranger District (2001). • Contracted to map approximately 40,000 acres of bunchgrass big game winter range and proposed prescribed burns (2001).
Funding	\$10,000	\$10,000+ /year
Biological	595 acres/year	<p>In fiscal year 2000, over \$5,000 was spent on bio releases and monitoring. Four insect species were released on three weed species. Forest personnel conducted 118 releases of a total of 29,600 insects. "Treated" 590 acres (118 releases @ 5 acres/release). Twelve previous bio release sites were monitored.</p> <p>In fiscal year 2001, over \$5,000 was spent on bio releases and monitoring. Seven insect species were released on 4 weed species. Forest personnel conducted 285 releases of a total of 71,155 insects. "Treated" 1,425 acres (285 releases @ 5 acres/release). Twelve bio release sites were monitored.</p>
Funding	\$10,000	\$5,000+/year
TOTAL FUNDS	\$22,000	\$17,000+/year

The indirect control program consisted of a wide variety of activities. Forest personnel staffed weed awareness booths at county fairs. Personnel were available to provide information and answer questions concerning weed management. Several weed management agencies (State, Federal, and private) worked together to coordinate weed management activities across the Forest. The Lolo National Forest and Missoula Valley Weed Managers (a consortium of public and corporate weed managers) developed the *Leave No Weeds* weed awareness education program for 6th grade school children in

1996. It is a very popular program and provides children an educational weed awareness experience. In fiscal year 2001, the *Leave No Weeds* program lead was transferred to the new Missoula County Weed District Weed Education Specialist. This was made possible by the successful June 2000 Missoula County weed mil levy vote.

The Forest weed program leader helped the County Extension Service produce a newspaper tabloid on weeds that was distributed throughout Western Montana in June 2000. In April 2001, a human health risk assessment addressing herbicide use in the Missoula Valley was completed. The risk assessment was a cooperative project between the Lolo National Forest and the Missoula Valley Weed Managers. The Forest also worked with the Citizens for a Weed Free Future, a local group of citizens working to improve weed management in Missoula County.

Recurrent activities such as posting weed free feed areas and giving weed awareness presentations to local clubs, organizations and university classes were also accomplished.

In fiscal year 2001, the Forest began and completed the Big Game Winter Range and Burned Area Weed Management EIS and Record of Decision, which addressed weed management on 87,400 acres of big game winter range and areas that burned in the wildfires of 2000. The Record of Decision was not appealed, which may be an indication of a successful information and education effort.

Prevention measures were applied on most Forest projects. Forest trails were inventoried for the presence of weeds. Wilderness rangers, trail crews, and District weed coordinators performed inventory work in association with other duties. Over 7,000 acres of area that burned in the wildfires of 2000 were inventoried in 2001. The Forest contracted with a private contractor to map 40,000 acres of big game winter range and proposed prescribed burning areas (2001).

The Forest spent at least 50 percent (\$5,000+) of the biological management program level described in the 1991 Noxious Weed Management EIS. At the same time, 99 percent (fiscal year 2000) and 239 percent (fiscal year 2001) of the biological management acre level described in the 1991 Noxious Weed Management EIS was accomplished. One biological release is defined as the release of 250 insects and is estimated to treat five acres. The Forest performed 118 releases in fiscal year 2000 and 285 releases in fiscal year 2001. Professional contacts and long-term working relationships with scientists in the biological management field enabled Forest personnel to acquire bio agents at no direct cost, which reduced the hard dollars spent in the Forest biomanagement program.

Evaluation:

Indirect Control Expenditures/Program Levels in Relation to Levels in the Lolo National Forest's 1991 Noxious Weed Management EIS: In fiscal year 2000, the Forest received 14 percent (\$52,100) of the budget necessary to implement the direction stated for the selected alternative in the 1991 Noxious Weed Management EIS (\$360,700/year). In fiscal year 2001, the Forest received 34 percent (\$124,000) of the budget necessary to implement the direction stated for the selected alternative in the 1991 Noxious Weed Management EIS (\$360,700/year). In both years, the Forest spent a greater percentage of the actual budget received on Indirect Weed Control than the proportion identified in the 1991 Noxious Weed Management EIS. That proportion varied by Indirect Weed Control program component. Refer to Table 6-3A for the specific expenditures and activities accomplished under each Indirect Weed Control program component.

Indirect Control Accomplishments in Relation to Levels in the Lolo National Forest's 1991 Noxious Weed Management EIS: In both fiscal year 2000 and 2001, the Forest was more than 15 percent below the funding level projected in the 1991 Noxious Weed Management

EIS. However, the Forest accomplished 99 percent of the biomanagement acre target in fiscal year 2000 and 239 percent of the biomanagement acre target in fiscal year 2001 with 14 percent (fiscal year 2000) and 35 percent (fiscal year 2001) of the budget identified in the 1991 Noxious Weed Management EIS. The Forest also accomplished a greater proportion of each of the other indirect weed control program components than the percentage that was funded (Refer to Table 6-3A). This was accomplished primarily due to efficient management practices. Broad scale weed inventory on the Forest is not a high priority because the Forest has a *resource* rather than a *species* based management strategy. Weed inventory is project driven. Refer to five resource priority site types in Amendment 11.

Recommendations: If the Forest commits additional funding and staff time, the Forest Indirect Weed Control Program could be expanded to include:

Information: Lolo Specific Weed Education brochure; A *Leave No Weeds* Brochure addressing specifically what recreationists can do to reduce weed spread on the Forest; Development of weed education and prevention interpretive signs at major trailheads, Forest portals and areas of concentrated public recreation.

Prevention: Continued implementation of the new R1 Weed Prevention Best Management Practices (BMPs) and inclusion of weed prevention BMPs evaluations in Forest Plan Monitoring Reviews.

Inventory: Continue project directed weed inventory contracts - emphasize high value resources such as winter range and prescribed burn areas; re-inventory areas that burned in the wildfires of 2000; initiate a GPS/GIS (Global Positioning System/Geographic Information System) inventory of all forest roads.

Biological: Initiate development of a GPS/GIS inventory and monitoring map and record system to track biomanagement agent impacts on target weeds.

Review of Last Year's Action Items: The only recommendation from the 1999 Forest Plan Monitoring report was to allocate additional funding to this program. The fiscal year 2000 weed budget (14 percent of 1991 Noxious Weed Management EIS level) was less than the fiscal year 1999 level (23 percent) and the fiscal year 2001 level (34 percent) was more than the 1999 level (23 percent).

Monitoring Item 6-4: Direct Noxious Weed Control

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Compare projected to actual acres of direct treatment (mechanical, herbicide, and biological methods).
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	25 percent of acres projected to be treated in the Lolo National Forest's 1991 Noxious Weed Management EIS

Introduction: This item was added from Forest Plan Amendment 11. The objective of this monitoring item is to document acres of direct weed control in fiscal years 2000 and 2001 in relation to the projected treatment acres in the Lolo National Forest's 1991 Noxious Weed Management EIS.

Methods: The Forest weed program leader monitors this item. Information is collected by District weed coordinators and compiled by the program leader. Annually, acres treated by direct weed control methods are compared to the program level described in the Lolo National Forest's 1991 Noxious Weed Management EIS. The 1991 Noxious Weed Management EIS projected levels for direct weed control activities such as physical, biological, and chemical control that could occur if the Forest weed program was fully funded.

Results: In fiscal year 2000, the Forest received 14 percent (\$52,100) of the budget necessary to implement the selected alternative in the 1991 Noxious Weed Management EIS (\$360,700/year). In fiscal year 2001, the Forest received 34 percent (\$124,000) of the budget necessary to implement the selected alternative in the 1991 Noxious Weed Management EIS (\$360,700/year). Tables 6-4A and 6-4B summarize acres of treatments accomplished using the fiscal year 2000 and 2001. Treatment acres are also compared in these tables to acres projected in the 1991 Noxious Weed Management EIS.

Compared to 1991 Noxious Weed Management EIS treatment projections, in fiscal year 2000, the Forest accomplished 5 percent (five acres) of mechanical treatments, 9 percent (237 acres) of herbicide treatments, and 99 percent (590 acres) of biological treatments. In fiscal year 2000, Forest personnel treated a total of 24 percent (832 acres) of the 3,440 acre annual projection in the 1991 Noxious Weed Management EIS with 14 percent of the budget. In fiscal year 2001, the Forest accomplished 3 percent (three acres) of mechanical treatments, 64 percent (1,757 acres) of herbicide treatments, and 239 percent (1,425 acres) of biological treatments. In fiscal year 2001, Forest personnel treated a total of 92 percent (3,184 acres) of the 3,440 acre annual projection in the 1991 Noxious Weed Management EIS with 34 percent of the budget.

Table 6-4A. Comparison of fiscal year 2000 accomplishments to projected 1991 Noxious Weed Management EIS acres to be treated annually with direct weed control methods.

Direct Control	Projected EIS Level Acres to be Treated Annually	Vegetation Management Accomplishment Acres with Weed Funds for Fiscal Year 2000	Percent of Projected EIS Level Accomplished in Fiscal Year 2000
Mechanical	105 acres	5 acres	5%
Herbicides	2,740 acres	237 acres	9%
Biological	595 acres	590 acres*	99%
TOTAL	3,440 acres	832 acres	24%

* This value represents 118 biological management agent releases at 50 acres per release.

Table 6-4B. Comparison of fiscal year 2001 accomplishments to projected 1991 Noxious Weed Management EIS acres to be treated annually with direct weed control methods.

Direct Control	Projected EIS Level Acres to be Treated Annually	Vegetation Management Accomplishment Acres with Weed Funds for Fiscal Year 2001	Percent of Projected EIS Level Accomplished in Fiscal Year 2001
Mechanical	105 acres	3 acres	3%
Herbicides	2,740 acres	1,757 acres	64%
Biological	595 acres	1,425 acres*	239%
TOTAL	3,440 acres	3,184 acres	92%

* This value represents 285 biological management agent releases at 5 acres per release

Fiscal Year 2000: In fiscal year 2000, an additional 1,231 acres were treated with herbicides using funding from various sources including range, KV (Knutson-Vandenberg Act), soils, wildlife, wilderness, cost share, cooperative, and purchaser funding. A total of 1,468 acres were treated with herbicides on the Lolo National Forest in fiscal year 2000.

Fiscal Year 2001: In fiscal year 2001, an additional 470 acres were treated with herbicides using funding from various sources including range, Knutson-Vandenberg (KV), fire, cooperative, research and purchaser funding. A total of 2,227 acres were treated with herbicides on the Lolo National Forest in fiscal year 2001.

Evaluation: The Forest is more than 25 percent below the direct control funding level required for full implementation of the selected alternative in the 1991 Noxious Weed Management EIS. In fiscal year 2000, the Forest received 14 percent of the program budget but only accomplished 9 percent of the herbicide control acres. However, Forest personnel accomplished 65 percent of the biomanagement acres in fiscal year 2000. In fiscal year 2001, the Forest received 34 percent of the program budget and accomplished 64 percent of the herbicide control acres and 239 percent of the biomanagement acres. The herbicide acre accomplishments in fiscal year 2000 fell short of the proportion of the budget received due to: 1) inadequate funding to do as much in all program areas, and 2) a steady Forest-wide emphasis on prevention, education and biomanagement even though there were budget reductions and shortfalls.

In both fiscal years 2000 and 2001, mechanical weed control accomplishments were considerably below the proportion of the budget actually received in comparison to the budget level in the 1991 Noxious Weed Management EIS. When the forest-wide Noxious Weed Management EIS was completed in 1991, Forest personnel were hopeful that

physical controls would be effective and affordable. In 1997, in an effort to evaluate the feasibility of expanding the mechanical control program on the Forest, a weed demonstration project was initiated to review the cost and effectiveness of various weed control methods, including hand pulling and mowing. Data gathered in 1998 from this demonstration project indicated that hand pulling cost about \$13,900/acre/year when pullers are paid \$9/hour. Mechanical treatments increased bare ground and provided relatively poor knapweed control. Mowing cost about \$200/acre and provide very poor control. For these reasons, the Forest will focus mechanical treatments on very small and isolated weed infestations.

Recommendations: If the Forest receives additional funding, more of the target program stated in the 1991 Noxious Weed Management EIS can be accomplished.

Monitoring Item 6-5: Noxious Weed Acres and Spread Assumptions

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Validate the Lolo National Forest's 1991 Noxious Weed Management EIS assumptions for weed acres and rates of spread.
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Unacceptable results of an Interdisciplinary Team review

Introduction: This item was added from Forest Plan Amendment 11. This objective of this monitoring item is to assess the weed infested acres and their rates of spread in relation to the assumptions in the Lolo National Forest's 1991 Noxious Weed Management EIS.

Methods: This is the fifth year of the five-year reporting period. This item was not monitored in fiscal years 2000 and 2001.

Results: No results.

Recommendations: Delete or combine this monitoring item with Item 6-6. The scale of the infestation and acres involved on the Lolo National Forest may preclude cost effective monitoring of this item. Limited/sample monitoring of spread rates could be accomplished if additional funding were available.

Review of Last Year's Action Items: In fiscal year 1999, a recommendation was made to combine this monitoring item with Item 6-6. This is recommended again for Monitoring Years 2000 and 2001 because both items focus on weed spread and the effectiveness of control efforts. There has been no action on this recommendation as proposed last year.

Monitoring Item 6-6: Noxious Weed Control Objectives

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor the attainment of control objectives for each of the nine species listed in the Lolo National Forest's 1991 Noxious Weed Management EIS
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Unacceptable results of an Interdisciplinary Team review

Introduction: This item was added from Forest Plan Amendment 11. This purpose of this item is to monitor the control objectives for each of the weeds listed in the 1991 Noxious Weed Management EIS. The weeds listed in the 1991 Noxious Weed Management EIS are spotted and diffuse knapweed, Canada and musk thistle, St. Johnswort, houndstongue, tansy, leafy spurge, and Dalmatian toadflax. The control objectives for each of these weeds are listed in Table 6-6A.

Table 6-6A. Noxious weed species and control objectives listed in the 1991 Noxious Weed Management EIS.

Weed Species	Prevent/ Eradicate	Suppress	Contain	Tolerate
New invaders	X			
Spotted knapweed		X*	X	X
Diffuse knapweed		X		
Canada thistle			X*	X
Musk Thistle	X			
St. Johnswort		X*	X	
Houndstongue		X		
Common tansy	New infestations		X	
Leafy spurge		New infestations*	X	
Dalmatian toadflax		X		

* In cooperative areas and special management areas listed in Amendment 11, Table W-2

Methods: This is the fifth year of the five-year reporting period. Weed treatments were monitored in fiscal years 2000 or 2001. Weed control is documented for herbicide treated sites by comparing before and after treatment photos. Biological release sites are monitored using photos points, ocular estimates, point-step transects, stem density measurements and net sweeps. Samples of all the treated sites on the Forest are monitored. Since herbicide treated plots commonly show a high level of control, more emphasis is placed on biomanagement monitoring in hopes we can learn more about the effects of this weed management tool.

Results: Sites on the Forest where herbicide treatments are applied show substantial reductions in weed density and spread. Herbicide treatments have provided effective weed control.

Monitoring emphasis is on biological release sites since there is wider variability in the site-specific effects of biological management agents. Forest personnel are hoping biological management will be effective in reducing weed spread and presence in the long term.

There are now 24, rather than nine invasive species of concern recognized on the Lolo National Forest. Several of these species have not been found on the Lolo National Forest but grow nearby and could quickly establish on the Forest. All methods of weed control are an ongoing activity that will require constant and long-term effort and are not expected to eradicate invasive plant species from the Lolo National Forest. The Forest's invasive plant management objectives are to prevent establishment of new weed species, slow the spread of existing weeds, protect high value resources and increase public awareness. Prevention measures are effective in raising public and Forest weed awareness and reducing weed establishment where weeds were not yet present. Weed awareness is at an all time high among Lolo National Forest employees and in the communities around the Lolo National Forest.

Evaluation: All of the nine listed weed species are spreading, but at a slower rate than if there was not a Forest weed control program. Implementation of this program is preventing new invaders from establishing, slowing the spread of existing weeds, and increasing public awareness.

Recommendations: Combine this item with Monitoring Item 6-5. Initiate larger drainage and/or landscape scale treatments to address the scale of infestations found on the Lolo National Forest. Continue to put treatment priority on high value resources such as big game winter range and areas of concentrated public use. Additional funding will be needed to better address this monitoring item.

Review of Last Year's Action Items: The 1999 Forest Plan Monitoring Report recommended reviewing this monitoring item to determine if it is meaningful. That review has been completed and found that it is meaningful and should be retained.

Monitoring Item 6-7: Noxious Weed Control Implementation and Effectiveness

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Random review of projects, field reviews, and contracts to assure that 1) weed prevention and control is addressed during planning and implementation and 2) that treatments are effective.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction or ineffective treatment practices

Introduction: This item was added from Forest Plan Amendment 11. The objective of this monitoring item is to assure weed prevention and control methods are identified in appropriate Forest projects and treatments are effective.

Methods: District weed coordinators monitor this item through spot checks, participation in project planning and project file reviews. The fiscal years 2000 and 2001 Forest Plan project monitoring review by line officers, staff and resource specialists is also a source of data for this item.

Results: In fiscal years 2000 and 2001, 13 and 51 sites, respectively, were monitored across the Lolo National Forest.

Monitoring at biological agent sites: Many of the leafy spurge biological management sites showed reductions in stem density. Insects were generally established on leafy spurge sites even when a change in stem density was not detected.

Spurge insects were sometimes found at higher densities at the edge of some infestations. At other sites, spurge insects formed a circular expansion from the point of release. A very pronounced decrease in spurge density was noted at some sites where herbicides were used in conjunction with insects.

Biological management has so far had little detectable effect on spotted knapweed. However, evidence of insects and substantial biological agent populations were found at most spotted knapweed release sites. Monitoring by the Regional Office entomology staff indicated that the Lolo National Forest has the oldest, best-established and widest spread *Agapeta zoegana* (knapweed root moth) site in Region 1.

Biological management agents are established on St. Johnswort and are having favorable results on some infestations.

Monitoring at herbicide treated sites: Herbicide monitoring indicated very good control on spotted knapweed, sulfur cinquefoil and St. Johnswort. Treatments stressed Dalmatian toadflax, but were not as effective as for other weeds. Herbicides provided good to very good control on the other five weeds listed above. The Forest established demonstration plots in the fall of 2000 to determine the effectiveness of the herbicide imazapic (Plateau) on leafy spurge, Dalmatian toadflax and cheatgrass.

Prevention Practices: Districts are implementing prevention practices on most but not all projects.

Tansy ragwort is a potential invader on the Forest and is found on two neighboring National Forests to the north. A single tansy ragwort plant, a potential new invader on the Lolo National Forest, was discovered on the north end of the Plains/Thompson Falls Ranger District in fiscal year 1999. A quick response was implemented in which the plant was removed and a reconnaissance of a several mile area around the plant was conducted to see if other plants were present. No other plants were discovered. The site is monitored and no additional plants were found in fiscal years 2000 or 2001. On the Superior Ranger District, a roughly 100 acre scattered infestation of tansy ragwort is found on private land immediately adjacent to the Lolo National Forest. The District is working closely with the Mineral County weed supervisor and the landowner to ensure the infestation does not spread onto National Forest land. Both these early detection and prevention situations have successfully kept this new invader off Lolo National Forest land.

Small infestations of orange hawkweed, another new invader, are being discovered on the Forest. Since this is a new invader and the infestations are small, eradication efforts are implemented on this species as they are detected.

Dalmatian toadflax is another weed that is uncommon on the Forest but is starting to appear, especially in areas of concentrated recreation use. Immediate control actions are taken when new infestations are discovered.

Evaluation: Sites with direct controls applied show significant reductions in weed density. Weed control is an ongoing activity and will require constant and long-term efforts. Forest personnel have been successful in preventing the establishment of new weeds on the Forest and controlling weeds on certain high value resource sites. Refer to Item 1-7 for effects of herbicides on forbs and grasses.

Recommendations: The Forest should to continue and expand the current monitoring efforts.

Review of Last Year's Action Items: The Forest is implementing the recommendation from the fiscal year 1999 Forest Plan Monitoring Report to keep monitoring.

Monitoring Item 7-1: Open Road Density

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure open road densities are in accordance with Forest Plan direction.
REPORTING PERIOD:	2 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Greater than 20 percent annually or 10 percent on a five year average.

Introduction: Forest-wide Standard 52(c) (Lolo National Forest Plan, page II-8) sets an open road density maximum of 1.1 miles of road per square mile in highly productive big game summer range. A comprehensive assessment of this open road density on the Lolo National Forest was initiated in August 1990, and completed in October 1991. Results of this study were displayed in the Fiscal Year 1991 Forest Plan Monitoring and Evaluation Report.

As reported in fiscal year 1991, open road density exceeded Forest Plan standards on 4 of 16 herd unit summer ranges. Herd units are equivalent to Montana Department Fish, Wildlife and Parks (MFWP) hunting units. On two of those units, the density was more than 20 percent over the maximum of 1.1 miles per square mile.

A plan to bring those areas into compliance with the Forest Plan standard was formulated and implemented in fiscal year 1992. Specifically, the Ninemile and Plains/Thompson Falls Ranger Districts closed many roads in their problem areas. The Missoula Ranger District prepared a Travel Plan Restriction Environmental Assessment and issued decisions, which addressed actions to bring Hunting Unit 204 into Forest Plan compliance. Implementation of decisions made in conjunction with that document began in fiscal year 1993.

The Seeley Lake and Superior Ranger Districts did not have herd units that exceeded the Forest Plan standard. Nevertheless, some open roads in highly productive big game summer range on those Districts have been closed in recent years. This has resulted in minor reductions in the open road density for Herd Units 201, 283, and 285. These reductions were reflected in the Fiscal Year 1996 Monitoring and Evaluation Report.

Methods: Road densities are calculated by dividing the total miles of open and drivable road within each MFWP hunting district by the area of high value elk summer range in square miles. High value range is designated in the Forest Plan database. Forest personnel calculated road densities using 2.64 inch/mile maps and electronic planimeters or manual map wheels.

Results: Open road density exceeds Forest Plan standards in Herd Units 203 and 210 (by 4 percent and 11 percent, respectively). Table 7-1A lists the open road densities on highly productive summer ranges per herd unit. Open road densities dropped from 48 percent over standard in fiscal year 1997 in Herd Unit 210 following road closures in fiscal year 1998 (refer to the Fiscal Year 1998 Forest Plan Monitoring and Evaluation Report). Although open road densities are below the +20 percent threshold that would require initiation of further evaluation, further opportunities to improve the open road density situation in these herd units will be investigated during landscape analysis processes,

such as the on-going landscape analysis in the Rock Creek drainage, and through cooperative partnerships with the Montana Department of Fish, Wildlife and Parks. Although progress has been made toward meeting Forest Plan standards in Unit 210, further progress will be difficult and the standard may not be attainable due to public attitudes in this area.

Table 7-1A. Open Road Density on Highly Productive Big Game Summer Range.

Herd Unit	System Road Density (mile/mile²)	Non-System Road Density (mile/mile²)	Total Density (mile/mile²)	Percent difference from standard
120	0.44	0.0	0.44	-60
121	0.18	0.0	0.18	-84
122	0.54	0.11	0.65	-41
123	0.63	0.02	0.65	-41
200	0.81	0.10	0.91	-17
201	0.84	0.21	1.05	-5
202	0.62	0.04	0.66	-40
203	0.91	0.23	1.14	+4
204	0.82	0.20	1.02	-7
210	1.09	0.13	1.22	+11
216	0.04	0.0	0.04	-96
240	0.59	0.04	0.63	-43
280	0.0	0.0	0.0	0
281	0.21	0.02	0.23	-79
283	0.19	0.05	0.24	-78
285	0.50	0.01	0.51	-54

Monitoring Item 7-2: Road Construction

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Review of road construction

REPORTING PERIOD:

Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

Road construction resulted in unacceptable resource damage or beyond construction tolerances.

Methods: Forest engineers calculate the total miles of road construction, reconstruction, and decommissioning from force account work performed and contracts awarded during the fiscal year. Construction includes new road construction, construction of portions of existing roads that are relocated to new alignments, and short-term (more than one season of use) road construction; temporary road construction (only one season of use) is not included. Road construction and reconstruction are counted in the fiscal year in which

the contract is awarded, or, in the case of force account work, when the work is actually performed.

Decommissioning refers to eliminating vehicular traffic, restoring natural drainage ways, and re-establishing vegetation so that the former road prism is self-maintaining and environmentally benign. Candidate roads are those that are not needed for National Forest management for a period of approximately 20 years.

Instances of unanticipated resource damage or construction beyond tolerances are typically discovered during field observations related to contract administration and annual Forest Plan monitoring trips.

Results:

Fiscal Year 2000: In fiscal year 2000, no roads were constructed and 50.1 miles were reconstructed. This represents 19 percent of the Forest Plan projected annual average road construction and reconstruction of 263 miles.

No instances of road construction that resulted in unanticipated short-term impacts or were beyond construction tolerances were reported or observed.

In fiscal year 2000, 24.7 miles of Non-system roads and 50.7 miles of System (National Forest System) roads were decommissioned, for a total of 55.4 miles of road decommissioned. Methods used were: entrance obliteration (28.7 miles closed), total recontouring (1.8 miles), partial (segment) recontouring (1.9 miles) and barricading/ripping the roadbed (23.0 miles closed).

Fiscal Year 2001: In fiscal year 2001, 0.5 miles of road were constructed and 35.6 miles were reconstructed, for a total of 36.1 miles. This represents 14 percent of the Forest Plan projected annual average road construction and reconstruction of 263 miles.

No instances of road construction that resulted in unanticipated short-term impacts or were beyond construction tolerances were reported or observed.

In fiscal year 2001, 20.2 miles of Non-system roads and 19.2 miles of System (National Forest System) roads were decommissioned, for a total of 39.4 miles of road decommissioned. Methods used were: entrance obliteration (15.7 miles closed), total recontouring (3.3 miles), and barricading/ripping the roadbed (20.4 miles closed).

Evaluation: The trend in the last decade is a reduction of miles of road construction and reconstruction far below Forest Plan estimates. In contrast, the miles of road decommissioned have generally been increasing. Further increases are expected in coming years due to continuing emphasis on decreasing the miles of unneeded roads on National Forest lands.

Recommendations: Through Forest Plan monitoring and accomplishment reporting, it has been observed that implementation of road decommissioning sometimes varies from Interdisciplinary Team recommendations and NEPA decisions. These result from construction administrators making changes based on field conditions. While the field decisions are based on evaluations of the actual conditions, the decisions may not be fully informed. It is recommended that proposals to change prescriptions should be discussed with the appropriate resource specialists and deciding official to ensure that all factors and consequences of the change are properly evaluated and documented.

Monitoring Item 7-3: Road Standards

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Review of road design and construction standards of all applicable Management Areas.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Designs beyond the limits of the standards

Methods: Designs beyond the limits of standards are documented or uncovered through the design variance process, project reviews, construction administration, and annual Forest Plan monitoring trips.

Results: No designs beyond the limits of standards were observed.

Monitoring Item 7-4: Road Density Projections

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor road density deviations from those projected in the Forest Plan direction.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departure from management direction.

Methods: Road densities are reported in transportation plans completed during the fiscal year. Densities are calculated by measuring the length of road and the area in each Management Area (MA), and dividing the road mileage by the square miles to get density in miles per square mile. Measurements are from paper maps and map wheels and planimeters or from digital maps in a Geographic Information System (GIS).

Results:

Fiscal Year 2000: One transportation plan, Boyer Fire Salvage, was completed in fiscal year 2000.

Fiscal Year 2001: In fiscal year 2001, three transportation plans (Upper Clearwater, Mill-Key-Wey, and Knox Brooks) were completed. At the time this Forest Plan Monitoring and Evaluation Report went to print, specific data was only available for the Knox Brooks transportation plan. Specific information on each of the transportation plans is available in the project files located at the responsible Ranger District office.

Road densities for Knox Brooks are shown in Table 7-4. In one management area, MA 22, road densities are significantly greater than the densities projected in the Forest Plan. This is due to the small size of MA 22 in the analysis area (only 0.2 square miles); roads existing in this MA skew the density figures upward. Overall road density after project implementation will be 3.9 miles/mile².

Evaluation: Fiscal year 2001 results reflect the trend in the last decade to lower road densities. Not only are fewer long-term roads being planned, but also existing roads are being reclaimed.

Table 7-4. Road Density by Management Area for Knox-Brooks, fiscal year 2001.

MA	Slope	Project Density (mile/mile ²)	Forest Plan Est. Density (mile/mile ²)	Percent Difference
16	0 - 40%	4.5	5.6	-19%
16	40%	3.4	6.7	-49%
18	0 - 40%	3.5	5.6	-38%
18	> 40%	2.3	6.7	-66%
22	0 - 40%	11.8	4.6	+157%
22	40 - 60%	0	4.8	-100%
23	0 - 40%	2.5	5.6	-55%
23	40 - 60%	2.0	5.9	-67%
23	> 60%	0.8	4.2	-82%
25	0 - 40%	7.0	5.6	+25%
25	40 - 60%	5.5	5.9	-6%
25	> 60%	2.8	4.2	-33%

Monitoring Item 8-1: Forest Service Project Effects on Minerals Activities

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Review of legislative actions, administrative and/or agency actions and projects that may have an effect on Forest Service permitted mineral activities and/or mineral lands availability.

REPORTING PERIOD:

Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

Any adverse effect on Forest Service permitted mineral projects and/or mineral lands availability.

Introduction: Monitoring Item 8-1 is a review of legislative actions, administrative and/or agency actions, and Forest Service projects that may have an effect on permitted minerals activities and/or mineral lands availability. This includes any legislative actions, agency actions, or Forest Service projects that would preclude or delay minerals activity or that would remove lands from being available for permitted minerals activities. Examples

include any change in land (mineral) status such as a minerals withdrawal due to a land being classified and designated as wilderness, a land exchange, recreational site development, or any other situation where the net result of such an action is either more or less land being made available for mining claim location and/or development.

It is rare that any project such as a timber sale or grazing permit would have any long-term effect on minerals availability or activities. A withdrawal or land exchange could have an effect. In the case of leaseable minerals, (i.e. oil and gas, coal, phosphate, etc.) management actions/decisions generally have a greater effect than do withdrawals since the lands made available for leasing is a discretionary action. In any case, the measure of effect would be the annual change in acres open to location for mining claims and/or acres available for mineral leasing.

The permitting of activities and/or mineral lands availability can also be affected by the rules, regulations, policies, and actions of other agencies. In fiscal years 2000 and 2001, due to the requirements of the Endangered Species Act (ESA), those activities with a potential to affect bull trout had to be reviewed by the U.S. Fish and Wildlife Service (USFWS). Therefore, the timeliness of that agency's review, as well as decisions or requirements made by that agency, had an effect on the permitting of activities and/or the availability of lands for mineral activity.

Methods: A review of land status records kept by the Forest Service and Department of Interior's Bureau of Land Management, forms the basis of information regarding the acres of mineral lands availability. The data recorded should include the number of acres available at the time of Forest Plan implementation as well as the number of acres available annually. A comparison of the net effect of legislative actions, land exchanges, withdrawals, etc., on the number of available mineral acres over time would be documented by changes in that data.

Official documents within the Forest's file system—correspondence, environmental analysis, and decision documents—provides the basis for identifying those legislative actions, administrative and/or agency actions and Forest Service projects that may have had an effect on the permitting of mineral activities and/or mineral lands availability.

Minerals and Geology Program outputs provide a measure of not only demand, but in some cases, the effect that legislative actions, administrative and/or agency actions and projects may have had on the permitting of mineral activities and/or mineral lands availability. These outputs are obtained from the agency's annual Management Attainment Report (MAR) that is reported at the close of each fiscal year. The data collected for the Minerals and Geology Program includes current and completed cases for the fiscal year as well as the volume of selected commodities extracted from lands administered by the Forest Service.

Results: No actions to change the net mineral acreage on the Forest were completed during fiscal years 2000 and 2001. Two land exchange actions were initiated in fiscal years 2000 and 2001 that may eventually affect the Forest's net mineral acreage. These were: fiscal year 2000--Alberton Gorge Land Exchange, with 674.4 acres leaving Federal ownership with no corresponding receipt of non-Federal lands; and, in fiscal year 2001, the Greenough II Land Exchange with 20 acres leaving Federal ownership and 10 acres being accepted into Federal ownership. No significant effect on any future development of minerals and/or oil and gas resources was noted in a minerals potential review of the affected lands.

Minerals and Geology Program outputs for fiscal years 2000 and 2001 are shown in Table 8-1. The number of reported case outputs for fiscal year 2000 was 152 and 134 for fiscal

year 2001. Respectfully, These outputs represents 92 percent and 80 percent of the Forest Plan projected annual average. The number of cases reported for fiscal year 1999 was 201.

Table 8-1A. Minerals Management Mineral Case Information

Fiscal Year	Unit (Cases¹)	Forest Plan Projected Annual Average	Percent Of Projection Since fiscal year 1987
2000	152	165	92
2001	134	165	80

¹ "Cases" are the number of new and existing Plans of Operation and Notices of Intent to operate. Cases include: locatable minerals operations; oil and gas lease recommendations completed; oil and gas exploration and development permits administered; mineral validity determination reports completed; occupancy cases resolved; site evaluations (e.g. mineral material sources, groundwater sources, etc.); planning inputs; mineral-in-character determinations for land exchanges; and mineral withdrawal reviews.

Evaluation: There were no legislative actions, administrative and/or agency actions and projects during fiscal years 2000 and 2001 that significantly changed the net acres of Forest Service System lands, administered by the Lolo National Forest, available for permitted minerals activities. The number of cases was down when compared to past years: 201 in fiscal year 1999; 203 in fiscal year 1998; and 140 in fiscal year 1997.

On May 12, 2000, the U.S. Fish and Wildlife Service issued the Biological Opinion for the Effects to Bull Trout from the implementation of ongoing actions associated with plans of operations for ten placer mining operations on the Superior Ranger District. As a result, the summer of 2000 was the first year that placer miners were to begin operating under the specific mitigation guidelines for bull trout that were identified in the Biological Opinion. A great deal of time was spent rebuilding and standardizing the Plans of Operation amendment in order to incorporate these changes.

However, Forest-wide mining operations were seriously curtailed in 2000 due to an extremely serious fire season. On the Superior Ranger District only one placer Plan of Operations, with an amendment, was approved prior to closure of the Forest on August 11, and no in-stream activity took place prior to the closure. A second placer Plan of Operations, with an amendment, was approved in September following the lifting of the Forest-wide fire closure. But by that date, due to Bull trout provision, in-stream operations were closed for the season and no in-stream work was conducted.

Recommendations: As noted in the 1998 Forest Plan Monitoring and Evaluation Report, this monitoring item could benefit from a thorough review of land status records kept by both the Forest Service and Department of Interior's Bureau of Land Management.

This collection of data would better establish what the base line conditions were at the time the Forest Plan was implemented with respect to mineral lands availability. Once the data is compiled, it would be updated annually to track the true number of available mineral acres on the Forest over time. The acres would have to be categorized as to locatable mineral acres (those minerals available under the General Mining Law of 1872) and leaseable acres (those mineral substance available under the provisions of the Mineral Leasing Act of 1920, as amended). In terms of the latter, it may have to be further subdivided into oil and gas acres, coal acres, etc.

Monitoring Item 8-2: Minerals Activities and Effects on Other Forest Resources

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Review of mining activities affecting surface resources and/or surface land management.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Departures from approved operating plans, leases, or permits that cause adverse effects to other forest resources or forest resource activities.

Introduction: This monitoring item is a review of mining activities affecting surface resources and/or surface land management. Activities can include departures from approved operating plans, leases, or permits. A departure might occur as a result of criminal intent not to follow the terms and conditions of the authorizing document or permit. A departure could also occur due to an unanticipated naturally occurring event and where the operating measures prove to be inadequate to counter the effects of that event, such as a landslide caused by a 100-year flood. The measure for this monitoring item is the number of departures and the action(s) taken to correct the departure(s).

Methods: Knowledge regarding “departures” from approved operating plans, leases, or permits are obtained through a review of permit inspection reports. To gauge compliance, the inspector evaluates the site and operations at the site against the terms and conditions found in the use permit, lease, or operating plan. A departure would be an observed condition or activity that is not allowed by the permit, lease, and/or operating plan.

Results: No documented departures from approved operating plans, leases, or permits was noted on any of the lands administered by the Lolo National Forest in fiscal years 2000 and 2001.

Evaluation: No departure from the terms and conditions of an approved operating plan was documented during fiscal years 2000 and 2001.

Recommendations: Frequent field monitoring is essential to noting mineral-related departures that may have an adverse effect on surface resources and/or surface land management. Each drainage with a potential for minerals activity should be visited no less than three times during each fiscal year (twice during each “summer” field season and at least once more during other times of the year).

Monitoring Item 8-3: Forest Service Minerals Activities With Positive Effects on Other Resources

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Review of mineral related activities positively affecting surface land resources and/or surface land management.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Forest Service permitted mineral project that have a positive effect on other forest resources and or forest resource activities.

Introduction: This monitoring item is a review of minerals-related activities that have or potentially will have a positive effect on surface resources and/or surface land management. A positive effect could result from the willingness of an operator to commit to a level of site reclamation or operating practices beyond that required by regulation or the authorizing document, and by activities undertaken by the Forest Service or a cooperator to reclaim mined land sites and/or reduce mine site safety hazards.

Methods: Knowledge regarding positive actions affecting surface land resources and/or surface land management comes from a review of permit inspection reports and agency work plans. To gauge compliance to permit, the inspector evaluates the site and operations at the site against the terms and conditions found in the use permit, lease, or operating plan as well as knowledge of where the operator offered to go beyond that required by regulation or the authorizing document. Agency work plans document actions directed toward the reclamation of areas adversely affected by minerals related activities.

Results: Reclamation planning continued in fiscal years 2000 and 2001 for the cleanup and reclamation of the Tarbox and Nancy Lee Mines site on the Superior Ranger District.

A final Engineering Evaluation/Cost Analysis (EE/CA) was issued for the Tarbox Mine in July 2000 and an Action Memorandum was completed for the project in August 2001. In late fiscal year 2001, a contract was awarded to Hydrometrics, Inc., of Kellog, Idaho, for the reclamation and restoration work that will commence in 2002. Restoration and reclamation activities will, most likely, be completed in the summer of 2002.

The Nancy Lee Mine and Mill Site CERCLA project was funded in 2001 and preliminary work on an Action Memorandum began in September 2001. Additional site investigation and characterization took place in the fall of 2000 and spring of 2001, and the Minerals Administrator worked with the contract architectural and engineering (A&E) firm on an updated Engineering Evaluation and Cost Analysis for the project. A contract package was prepared for solicitation. In late fiscal year 2001, a restoration contract was awarded to KD&S, Company of Kingston, Idaho. The reclamation and restoration work is scheduled to begin in 2002 with an expectation that restoration and reclamation activities will, most likely, be completed in 2003.

Reclamation vegetation success was monitored at the Gail #1 Placer Mining Claim on the Ninemile Ranger District during fiscal year 2001. This old mining site is also being

considered for development as a mineral material site to support Forest Service post-burn activities in the upper Ninemile Valley.

In fiscal year 2001, a CERCLA Action Memorandum was prepared for a time-critical removal action in the Flat Creek drainage on the Superior Ranger District because a major forest fire and subsequent debris flow moved through an abandoned mine tailings area adjacent to Flat Creek. This project was coordinated with the Regional Office and involved the use of an A&E firm to prepare a *Sampling and Analysis Plan*, a *Quality Assurance/Quality Control Plan*, and a *Health and Safety Plan*. Site reconnaissance and drilling at the site occurred in late April and early May 2001. District staff worked with the A&E firm on finalizing the Investigation and Engineering Report and contract specifications in August, and the contract was awarded in September.

Evaluation: Reclamation and restoration activities at the Nancy Lee and Tarbox Mine sites will eliminate various physical hazards and releases of sediment and heavy metals that adversely affect human and environmental health.

Recommendations: Additional funding should be granted to identify and plan for the reclamation of additional abandoned mine sites on the Forest. Successful mined land site reclamation and hazard reduction depend on competent staff as well as adequate planning and funding. During fiscal year 2001, three individuals received the training and qualifications necessary to administer mine site reclamation contracts. Currently, there are four qualified individuals on the Lolo National Forest.

Monitoring Item 9-1: FORPLAN Unit Costs

**ACTIVITY, PRACTICE OR
EFFECT TO BE MEASURED:**

Verification of unit costs used in FORPLAN

REPORTING PERIOD:

Annual

**VARIABILITY (+/-) WHICH
WOULD INITIATE FURTHER
EVALUATION:**

In general, plus or minus 25 percent variation would trigger need to rerun FORPLAN

Introduction/Methods: The Forest economist uses FORPLAN computer models to evaluate activities for the Forest Plan. See Appendix B of the Forest Plan for a complete description of the process. This monitoring item verifies unit values used in FORPLAN have not changed significantly.

There are a number of reasons why unit costs would change over time. Such factors include: 1) changes in local and national timber market conditions; 2) the general state of the economy, which leads to inflationary prices during periods of expansion; 3) adoption of new harvesting technology by purchasers; 4) modified and/or improved post-sale treatment methods implemented by the Forest; and 5) changes in the budget and staffing on the Forest.

In 1988, Forest personnel conducted a systematic collection and analysis of all unit costs. This was accomplished for the first time since unit costs and timber values were initially

gathered for FORPLAN in 1978. The Forest economist incorporated the revised costs and values in FORPLAN and reported the results in the 1988 Forest Plan Monitoring Report.

In 1991, the University of Montana, Bureau of Business and Economic Research branch, collected stump to truck harvest costs from logging operators. The results of this study were presented in the 1992 Forest Plan Monitoring Report.

Results/Evaluation: Average management costs appear to change significantly from year to year. The total dollar amount does not change as much as the unit costs because the unit costs are determined by dividing the total cost by the timber volume offered or harvested. Volumes offered and harvested change for a variety of reasons, often tied to market conditions. Table 9-1A shows how unit costs for several timber management activities with available data have varied over the past seven years.

Table 9-1A. Unit Costs for Timber Management Activities (1995 base dollars).

Activities	1995	1996	1997	1998	1999	2000	2001
Sale Preparation (\$/MBF)	36	30	18	26	57	119	24
Sale Administration (\$/MBF)	28	18	15	16	22	21	30
Reforestation, KV and Appropriated (\$/Acre)	712	464	325	292	417	318	309

Table 9-1B shows the change in advertised price and the actual high bid value. The advertised price is the minimum acceptable bid. Timber prices peaked during the summer of 1990, dropped off in 1991, climbed steadily through 1992 and 1993, and stayed at high levels in 1994. Prices in 1995 were volatile and generally below 1994 levels. Federal legislation emphasized harvest of salvage timber material in the second half of 1995, which resulted in lower-valued material offered as part of the Forest timber program. High bid prices in 1996 through 1999 were generally more stable than the previous year, but in 2000 and 2001 the high bid prices were again quite volatile over time. The difference between advertised prices and the actual bid values can result from many factors such as increased finished product prices, increased competition, reduced costs, and improved harvest technology. Throughout this time there have been many mill closures resulting in a change in demand for stumpage material offered by the Forest Service.

Table 9-1B. Advertised and Actual Average Stumpage Values for Fiscal Years 1990-2001 (\$/MBF).

Year/Quarter	Advertised Price	Actual High Bid	Difference
1989			
1 st quarter	\$27.44	\$42.88	\$15.44
2 nd quarter	\$36.70	\$96.16	\$59.46
3 rd quarter	\$22.59	\$112.02	\$86.43
4 th quarter	\$27.09	\$109.34	\$82.25
1990			
3 rd quarter	\$46.56	\$180.51	\$133.95
4 th quarter	\$48.30	\$102.28	\$53.98

Year/Quarter	Advertised Price	Actual High Bid	Difference
1991 2 nd quarter 3 rd quarter 4 th quarter	\$75.86 \$75.93 \$97.38	\$91.50 \$128.55 \$105.23	\$15.70 \$52.62 \$7.85
1992 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$44.85 \$76.38 \$116.61 \$168.99	\$63.43 \$173.09 \$274.98 \$221.73	\$18.58 \$96.71 \$158.37 \$52.74
1993 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$155.52 \$73.05 \$230.54 \$314.25	\$200.87 \$355.44 \$230.94 \$390.48	\$45.37 \$282.39 \$0.40 \$76.23
1994 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$357.88 \$256.34 \$400.31 \$194.07	\$358.75 \$365.23 \$445.18 \$194.07	\$0.87 \$108.89 \$44.87 \$0.00
1995 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$71.50 \$89.43 \$82.33 \$208.49	\$136.17 \$249.43 \$88.95 \$234.45	\$64.67 \$160.00 \$6.62 \$25.96
1996 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$95.15 \$36.50 \$48.76 \$63.00	\$158.47 \$111.65 \$103.21 \$199.13	\$63.32 \$75.15 \$54.45 \$136.13
1997 1 st quarter 2 nd quarter 3 rd quarter 4 th quarter	\$ 63.16 \$162.43 \$ 63.94 \$103.11	\$173.03 \$233.50 \$122.51 \$170.34	\$107.87 \$ 71.07 \$ 58.54 \$ 67.23
1998 1 st quarter 2 nd quarter	\$128.22 \$132.36	\$193.38 \$138.00	\$65.16 \$ 5.64
1999 2 nd quarter 3 rd quarter	\$96.98 \$45.84	\$110.39 \$132.70	\$13.41 \$86.86
2000 1 st quarter 4 th quarter	\$188.22 \$ 34.89	\$215.84 \$ 39.86	\$32.59 \$ 4.97
2001 1 st quarter 2 nd quarter 4 th quarter	\$71.48 \$81.09 \$55.82	\$ 79.51 \$110.33 \$117.78	\$ 8.03 \$32.01 \$61.69

Table 9-1C shows a decline in inflation adjusted delivered log values in the past two years for all species. Stumpage values have historically been more volatile than delivered log prices because of increased competition among stumpage purchasers. Stumpage prices merely result from prices paid by mills that process the raw material. Prices for finished products in Table 9-1D show they also declined during the past two years. Imported lumber from western Canada continues to have an influence on finished product prices despite the fact that stumpage supplies for local mills has declined significantly since 1992.

Table 9-1C. Delivered Log Values (\$/MBF in 1995 dollars).

Species	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ponderosa Pine	355	411	602	557	500	491	509	441	475	456	437
Bull Pine	218	267	449	399	300	314	315	297	322	319	304
Lodgepole Pine	247	286	441	433	355	383	392	361	403	383	341
Douglas-fir	246	298	454	430	363	373	379	351	390	375	345
Western Larch	246	302	468	439	365	373	390	357	391	368	344
Englemann Spruce	256	308	472	443	350	392	438	363	394	375	334

Table 9-D. Lumber Price Indices (\$/MBF).

Species	1993	1994	1995	1996	1997	1998	1999	2000	2001	Change from 2000 to 2001
Ponderosa Pine	676	665	602	597	696	574	579	513	492	-4%
Douglas Fir/ Larch	417	418	363	415	430	356	393	347	330	-5%
White Woods	364	406	338	375	406	350	354	310	296	-5%

Monitoring Item 10-1: Visual Quality Objectives

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Monitor project and activity compliance with visual quality objectives.
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Failure to meet intended Visual Quality Objectives (VQO)

Introduction: Each year the Lolo National Forest monitors projects that have recently been completed to determine whether Forest Plan Standards have been met. Forest Plan standards for visual quality are called Visual Quality Objectives (VQOs) and have been established for each Management Area (MA) on the Lolo National Forest. The Visual Resource Management System (National Forest Landscape Management System, Volume 2, Chapter 1, Handbook 462) outlines VQOs and is used as a guideline for this purpose.

Methods: On September 18, 2001, the Lolo National Forest monitored the Northside Timber Sale on the Missoula Ranger District. This project area is north of and is visible from the community of Missoula, Montana. Units of this timber sale are accessed from secondary roads throughout this area. Since most of this area is visible in the background from Missoula and the surrounding area, the Lolo National Forest Plan identified this area as visually sensitive. Visually sensitive areas were allocated to MAs 23 and 25 in the Forest Plan, which have a Visual Quality Objective (VQO) of Partial Retention.

The Forest landscape architect and the Seeley Lake District Ranger, who is trained in the study of visual quality, monitored the effects of the Northside Timber Sale. These individuals walked through, performed ocular surveys, and discussed the visual effects of the harvesting in Units 24 and 24A.

Results: Observations of the Northside Timber Sale from main Missoula area viewpoints show very little texture change. Occasionally, road locations are visible but even those are minimal. Management activities are mostly unnoticeable from the valley floor and sometimes difficult for even the trained eye to identify. Overall, the sale meets, and in many places exceeds, the partial retention VQO.

Specifically, Units 24 and 24A were walked through and reviewed in detail during the monitoring trip. Both of these units are located on timberlands allocated to a Partial Retention VQO (MAs 23 and 25). Layout of these units took advantage of natural ridgelines and swales and the distribution of leafy trees appeared random. The economics of slash disposal of the entire Northside Timber Sale was discussed. On-site observations revealed that these units meet the Forest Plan allocated VQO of Partial Retention when viewed in the foreground (from point of observer to ¼ mile distance).

Evaluation: All of the units monitored in the Northside Timber Sale met or exceeded the VQOs set for this project area by the Forest Plan.

Recommendations: Decisions made during the NEPA process for the Northside Timber Sale proved economically and/or physically infeasible during project implementation,

particularly in relation to slash disposal. This resulted in a need for the project interdisciplinary team to revisit and reevaluate changed conditions numerous times. More time should be taken during project planning to carefully consider economic feasibility of project implementation.

Monitoring Item 11-1: Prescribed Fire and Air Quality

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Assure prescribed fire meets air quality guidelines and standards
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Burning without required permit

Methods: Fire Management personnel compile a list of all burning units to report burning activities to the Airshed Group Manager and check for permit compliance. The list is entered on a new, web-based, data entry system that is maintained by the Airshed Group Manager and Meteorologist.

Results: The Lolo National Forest accomplished all prescribed burning activities during fiscal years 2000 and 2001 under permit and within guidelines of the Montana State Airshed Group. The Lolo National Forest is an active participant in this group.

Evaluation: During 2000 and 2001, the Lolo National Forest accomplished all prescribed burning projects under permit and within Montana State Airshed Group guidelines.

Recommendations: Continue close association and participation with the Montana State Airshed Group.

Monitoring Item 11-2: Fuel Treatment Projections

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED: Assure accomplishment of fuel treatment targets.

REPORTING PERIOD: Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION: Less than 75 percent of Forest Plan projection.

Methods: Fuel treatment accomplishments, Brush Disposal (BD) and Forest Fire Protection-115 (FFP) and National Fire Plan (NFP) Funds (for 2001), are reported annually in the Timber Stand Management Reporting System (TSMRS), which is maintained in the Forest Supervisor's office. Fire management personnel query that database to report the acres in this report and compare with Forest Plan projections and decadal averages. Accomplishments are now also reported on the new, National Fire Plan, web-based database. This creates double data entry efforts for the Forest. A procedure is being developed on Forest to query TSMRS and report the same accomplishments in the National Fire Plan database.

Results: The accomplishments for 2000 and 2001 are listed in Table 11-2A. Accomplishments fell short of targets in both years but more so in 2001. The annual average acres projected to be accomplished for Decade 1 in the Forest Plan is also listed in Table 11-2A.

Table 11-2A. Target and Actual Fuel Treatment Accomplishments for fiscal years 2000 and 2001.

Activity	Fiscal year 2000 Target (acres)	Fiscal year 2000 Accomplishment (acres)	Fiscal year 2001 Target (acres)	Fiscal year 2001 Accomplishment (acres)	Decade 1 Forest Plan Projection (annual average) (acres)
Forest Fire Protection (FFP-115)	10,896	10,829	6,064	4,970	2,435
Brush Disposal (BD)	2,498	1,658	1,965	1,145	6,509
National Fire Plan (NFP) Funds	0	0	8,543	5,882	N/A
Unplanned Ignition	N/A	0	N/A	0	N/A

Evaluation: During the 15-year period under the Forest Plan, fuel treatments have averaged 188 percent of projection for FFP-115 funded activities, but only 43 percent of projection for treatments funded by BD deposits. Table 11-2B displays these averages. The BD treatments are tied to the timber sale program. The low BD accomplishment is because timber harvest levels are lower than projected; refer to Item 3-10.

Table 11-2B. Actual vs. Projected Fuel Treatment Accomplishment Averages 1987-2001

Activity	Plan Projected (Annual Average) (acres)	Actual Average to Date (acres)	Percent of Projected
Fuel Treatment FFP-115 funded	2,453	4,584	188%
Fuel Treatment BD Funded	6,509	2,776	43%

Concerning FFP-115, burning for ecosystem maintenance and forest health will remain a priority as referenced in "Fire in Western Montana Ecosystems", now called the "Ecosystem Maintenance Burning Guide". If funding is available, accomplishments in FFP-115 are expected to be maintained at 12,000 acres, annually. In BD, the acres treated are expected to decrease because of a decrease in projected timber harvest level. If these projections are accurate, BD accomplishments will be about 40 percent of planned acres.

Recommendations: The data suggests the Lolo National Forest is likely to remain well below 75 percent of planned projections in BD. Out-year estimates should be reevaluated to determine accuracy of projections as outlined in the Forest Plan. The 1999 Forest Plan Monitoring and Evaluation Report recommendation to annually review Forest BD projects should be implemented.

Review of Last Year's Action Item: The "Fire in Western Montana Ecosystems" publication was updated in 2001 and called the Ecosystem Management Burning Guide. A program of 50,000 acres per year best reflects the ecological needs of communities based on the historic burn intervals for each habitat type group. The 12,000 to 15,000 maximum annual burn acres estimate was reviewed by the Interdisciplinary Team and reflects the burn program capacity. The burning program is ultimately limited by funding, burning windows (weather, etc.), smoke dispersion and available personnel and equipment. Habitat groups (or some other classification) may be substituted for management areas for the purpose of assigning burn targets and should be used by the Zone Forest Plan Revision team.

Research and monitoring studies of the impact of burning on noxious weeds will continue to identify the risk and possible mitigation actions needed for burning weed-infested areas.

Monitoring Item 11-3: Wildfire Acres

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Evaluate impact of wildfire losses on management area targets.
REPORTING PERIOD:	10 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Wildfire losses 100 percent above prediction by Management Area for the decade.

Methods: Fire management personnel compared the average annual total to the Forest Plan projected average. The annual number of acres burned by wildfire is stored and queried from the 5100-29 Fire Reports on NIFMID system (National Interagency Fire Management Information Database) at Kansas City (accessed off of Famweb).

Results: Wildfire acres in calendar year 2000 totaled 73,966 acres on Forest Service ownership and 14 acres on private property within Forest Service protection boundaries. For calendar year 2001, wildfire acres totaled 2,410 acres on Forest Service ownership. Table 11-3A displays wildfire acres only, and does not reflect acres burned while fires were in wildland fire use prescription status. The table compares average acres burned over a 15-year period to a 10-year projected average stated in the Forest Plan.

Table 11-3A. Wildfire Acres (Actual vs. Projected Annual Averages).

Activity	Plan Projected (annual average) (acres)	Average to date (acres)	Percent of Projected
Wildfire Loss	2,907	8,566	295%

Evaluation: For the 15-year period under the Forest Plan, average annual wildfire acreage is over the Forest Plan projection because of the Canyon Creek Fire in 1988 and the numerous large fires in 2000.

For wildland fire use (prescribed natural fire), Appendix V in the Fire Management Plan (which is Appendix X of the Forest Plan) shows a total of 250 acres per year in Management Areas (MAs) 11 (Roadless) and 12 (Wilderness). The National Forests that manage the Bob Marshall/Scapegoat Wilderness Complex revised the wildfire use (previously prescribed natural fire) program in 1991. Since implementation in fiscal year 1991, few ignitions have met the criteria for a prescribed fire in these two MAs. In 2001, the Birk fire spread from the Flathead National Forest where it was in wildland fire use status. It totaled 4,536 acres on the Lolo National Forest side and attempts were made to suppress it when it exceeded its maximum manageable area (MMA). Of the 4,536 acres, 1,185 acres were outside the Fire Management Boundary for fire use and 982 acres were outside the MMA. The entire fire was changed to wildfire status so acres technically should not be used to compare with Forest Plan projections. Excluding the Birk Fire (if Birk is counted as a wildfire), the Lolo National Forest has averaged 68 percent of projection. Including the Birk Fire as wildland fire use, The Lolo National Forest would be 180 percent of Forest Plan projection.

The acceptable limit of wildfire acres in MA 11 (Roadless) and MA 12 (Wilderness/Proposed Wilderness) continues to require re-evaluation, especially given new direction per the National Wildland and Prescribed Fire Management Policy (August 1998). Re-evaluation will be accomplished with the Forest Plan revision effort.

Recommendations: Review projections of wildfire acres and wildland fire use acres during Forest Plan revision. Also, during Forest Plan revision, evaluate the possible addition of areas in other Management Areas (besides MA 11 and 12) to the category for wildland fire use.

Monitoring Item 12-1: Effects on Local Communities and Other Landowners

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Effects of forest management on local economy, recreation opportunities, downstream water uses, visual quality, local air quality.
REPORTING PERIOD:	5 years
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Unacceptable results of an Interdisciplinary Team review

Introduction/Methods: The change in area employment and area income is based on a historic timber harvest level in the Forest Plan of 92 million board feet (MMBF) and an average permitted livestock level of 13,800 animal unit months (AUMs). The Lolo National Forest provides only a portion of the total timber harvest and forage produced in this market area. Actual changes in area employment and income are a result of total area economic activity, of which the Lolo National Forest is only a part.

Results: The estimates displayed in Table 12-1A show the change in total income and employment if changes in Lolo National Forest outputs were not offset by supplies from other sources. Since there are other sources of timber and grazing inputs to area markets in addition to those from the Lolo National Forest, the actual total impact experienced in the market area may be substantially less than the values displayed in this table.

Table 12-1A. Actual vs. Projected Total Income and Employment, 1987-2001.

Activity	Unit	Plan Projected (Annual Average)	Actual Average to Date	Percent of Projected
Change in Area Employment	jobs/year	435	-544	-125%
Change in Area Income	million 1996 \$	\$11.5	-\$13.8	-120%

Activity	Unit	Plan Projected (Annual Average)	Actual Average to Date	Percent of Projected
Payments to Counties	million 1996 \$	NA	NA	NA

NA = Not Applicable

Evaluation: The changes in income, employment and payments to counties are based on the same assumptions for jobs and income per unit (thousand board feet (MBF) for timber harvest and AUM for grazing) as were used in the Forest Plan. Actual impacts for the Lolo National Forest market area depend on public and private supplies, which are influenced to some extent by economic conditions at local and national levels.

Previous monitoring reports displayed "Payments to Counties". Payments to counties were based on 25 percent gross receipts for timber sales, grazing permits, etc. The "Secure Rural Schools and Community Self-Determination Act of 2000" allowed counties to opt for a stable payment based on the average of the states' highest three payments between fiscal years 1986 and 1999. All counties with Lolo National Forest lands chose the level payments, which will remain in effect through 2006.

Monitoring Item 13-1: Land Adjustment Program

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED: Evaluate progress of landownership adjustment program.

REPORTING PERIOD: Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION: Not Applicable

Introduction: The intent of this monitoring item is to evaluate the progress of the Forest's landownership adjustment program.

Methods: The Lolo National Forest completed one land exchange during fiscal years 2000 and 2001. In fiscal year 2001, the Lolo National Forest completed the Snowshoe Gulch land exchange, which transferred 20 acres, located at Double Arrow Lookout on the Seeley Lake Ranger District, into Federal ownership and transferred approximately 20 acres on the Superior Ranger District into private ownership.

The Forest worked on several land exchanges during fiscal years 2000 and 2001. These land exchanges are in various stages of progress. The Alberton Gorge land exchange is approximately 75 percent complete and would transfer private land along Clark Fork River into public ownership. In return, the Lolo National Forest will give up ownership of approximately 320 acres in a section that is isolated from other National Forest System lands. The Lolo National Forest is also working on the Blackfoot-Clearwater land exchange, which will exchange approximately 5,000 acres of National Forest System land

for approximately 4,000 acres of private lands. The Lolo National Forest is just beginning to process a land exchange with the Montana State Department Natural Resources and Conservation (DNRC). This land exchange would transfer approximately 15,000 acres of National Forest System land to the DNRC and the Lolo National Forest would acquire approximately 14,000 acres of DNRC land. The Lolo National Forest is also completing a small land exchange, named Greenough II, with a private individual to obtain approximately 10 acres of private land surrounded by National Forest System land in the Keystone drainage on the Superior Ranger District.

The Lolo National Forest acquired a portion of the Lolo Trail from Graves Creek southwest to Lolo Pass from Plum Creek Timber Company. The Lolo National Forest received approximately 1247.91 acres in fee and approximately 2.5 miles of Trail Easement. This will allow public access to approximately 14 miles of Lolo Trail from Graves Creek to Lolo Pass. The 136-mile trail, which extends from Lolo, Montana to Weippe, Idaho, is a historic trail that was used by the American Indian and the Euro-American settlers of the west.

Results: The purpose of these land exchanges is to acquire important wildlife habitat and scenic landscapes; and to consolidate federal and non-federal ownership to help improve land management efficiency. The Snowshoe Gulch land exchange, completed in 2001, will improve the efficiency of managing the communication site at Double Arrow Lookout.

Evaluation: The Forest Plan directs acquisition of isolated parcels having specific resources complementing National Forest management. These land exchanges will enhance wildlife habitat by placing more wildlife habitat acres under National Forest management. In addition, several of the parcels will benefit fisheries by providing additional habitat and aquatic resources important for bull trout. These exchanges will also improve scenic landscapes. Land management efficiency has been improved in the Snowshoe Gulch land exchange by providing more land to develop a communication site at the Double Arrow Lookout. The Greenough II land exchange will allow the Lolo National Forest to acquire an isolated parcel surrounded by National Forest land, which will provide for more efficient management of the National Forest.

Recommendations: Direction from the Forest Service Washington Office on the landownership adjustment program and Forest Plans will be issued in the near future. When the Forest Plan is revised, this new direction should be incorporated.

Monitoring Item 13-2: Utility/Transportation Corridors

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:

Insure major utility and transportation systems are developed within identified corridors.

REPORTING PERIOD:

During Project Construction

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:

Deviation from identified corridors

Introduction: The intent of this monitoring item is to evaluate the development of major utility and transportation systems within identified corridors.

Methods: The Forest Lands Specialist reviews last year's projects/cases.

Results: No utility or transmission corridors were designated through the Lolo National Forest in 2000 and 2001. The final Yellowstone Pipeline Environmental Impact Statement was completed in November 2000 and the Record of Decision was completed in May 2001. Yellowstone Pipeline has completed a majority of the reroute and abandonment of its petroleum pipeline that crosses National Forest System lands.

Evaluation: By removing the pipeline from Prospect Creek on the Plains/Thompson Falls District, the project will have a positive effect on the fisheries. The rehabilitation of the Prospect Creek stream channel will be completed within the next few years.

Recommendations: No new recommendations.

Monitoring Item 13-3: Right-of-Way Grants

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED: Assure proposed right-of-way grants are in identified corridors.

REPORTING PERIOD: Annual

VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION: Any project outside identified corridors.

Introduction: The intent of this monitoring item is to evaluate the right-of-way grants outside of identified corridors.

Methods: The Forest Lands Specialist reviews last year's projects/cases.

Results: The Lolo National Forest issued authorizations or amendments to existing authorizations, for several minor utilities rights-of-way and one major utility right-of-way. These small right-of-way authorizations were for minor "spur" or "feeder" electric and telephone lines, which provide local service, not major power transmission nor other utility facilities. In May 2001, Touch America, a major communication company, was granted an authorization to install a fiber optics line along Interstate 90. Since this is considered a major corridor across the Lolo National Forest, this route meets the Forest's objectives.

Evaluation: All of the projects are reviewed to ensure they are in compliance with the Forest Plan before the authorization is issued.

Recommendations: This may not be an effective evaluation criterion. Considering that private requests to use National Forest System land will likely increase, evaluating all land use authorizations may be more appropriate.

Monitoring Item 14-1: Emerging Issues

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Track emerging issues or changing social values
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	If issues fall within scope of interest levels 1 and 2 of Information and Involvement Plan

Evaluation/Recommendation: Revise the monitoring process for this item. Change the “variability which would initiate further evaluation” to None. This item is used to communicate emerging issues to the public.

Results: As part of the Forest Plan monitoring process, the Lolo National Forest annually highlights emerging issues in a report to the public.

There were no new emerging issues in fiscal years 2000 and 2001.

Monitoring Item 14-2: Land Allocation Errors

ACTIVITY, PRACTICE OR EFFECT TO BE MEASURED:	Correct errors in original land allocations; evaluate effect of Forest Plan changes on all Management Areas (MAs).
REPORTING PERIOD:	Annual
VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION:	Changes impacting projected targets.

Evaluation: This monitoring item alerts the Forest Supervisor to the number of changes to the database. When a sufficient number have been made, the outputs generated by the FORPLAN II model may no longer be valid.

The Lolo National Forest implemented a standardized system for documenting and evaluating proposed changes to the Forest Plan database. The system works reasonably well. Project interdisciplinary teams review Forest Plan land allocations early in the project development process. Errors or mis-allocations identified and field verified are submitted to the Forest Supervisor for evaluation and approval. The Lolo National Forest incorporated the approved Management Area (MA) corrections during 1987-2001 into the Forest Plan through amendments #4, #5a, #6, #7, #8, #13, #15, #17, #20, #22, #23, #24,

#25 and #26. In 2001, Amendment #26 adjusted the Management Area designation on 407 acres in the Mill-Key-Wey project area on the Superior Ranger District. These error corrections are based on field verifications on topography, soils, habitat type, and vegetation conditions.

Table 14-2A. Net MA Changes (acres).

MA	18	19	21	23	25	27
Acres	-8	-276	+46	+238	+69	-69

Timber suitability changes were calculated by net transfers from MAs (16, 18, 21, and 23), to unsuitable MAs (19 and 27). A total of 31 acres changed from suitable to unsuitable, and 376 acres changed from unsuitable to suitable. The net change is an increase of 345 suitable acres.